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Security Council

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Letter dated 6 February 2006 from the Secretary-General addressed to the President of the Security Council

I have the honour to convey the attached communication, dated 4 February 2006, which I received today from the International Atomic Energy Agency (IAEA) regarding the implementation of the Safeguards Agreement between the Islamic Republic of Iran and IAEA (see annex). I should be grateful if the present letter and its annex could be brought to the attention of the Members of the Security Council.

(*Signed*) Kofi A. **Annan**

Annex

Letter dated 4 February 2006 from the Director General of the International Atomic Energy Agency addressed to the President of the Security Council

In paragraph 2 of resolution GOV/2006/14 of 4 February 2006 of the International Atomic Energy Agency (IAEA) Board of Governors, the Board requested that I transmit to the Security Council all IAEA reports and resolutions, as adopted, relating to the implementation of the Safeguards Agreement between the Islamic Republic of Iran and the International Atomic Energy Agency in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (see enclosures).

The Board also requested me to report to the Security Council the steps required of the Islamic Republic of Iran as specified in paragraph 1 of the same resolution.

I should be grateful if you would bring the present letter and its enclosures to the attention of all Members of the Security Council.

(*Signed*) Mohamed **ElBaradei**

Enclosures

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Reports/meeting records/update brief

Developments in the Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran and Agency Verification of Iran's Suspension of Enrichment-related and Reprocessing Activities

Update Brief by the Deputy Director General for Safeguards*

31 January 2006

The purpose of this brief is to provide an update on the developments that have taken place since November 2005 in connection with the implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran (Iran) and on the Agency's verification of Iran's voluntary suspension of enrichment related and reprocessing activities. The brief provides factual information concerning those developments; it does not include any assessments thereof.

Iran has continued to facilitate access under its Safeguards Agreement as requested by the Agency, and to act as if the Additional Protocol is in force, including by providing in a timely manner the requisite declarations and access to locations.

1. Enrichment Programme

As detailed in the Director General's report of 18 November 2005, during meetings that took place in October and November 2005, the Agency requested Iran to provide additional information on certain aspects of its enrichment programme. Responses to some of these requests were provided during discussions held in Tehran from 25 to 29 January 2006 between Iranian officials and an Agency team, headed by the Deputy Director General for Safeguards. This information is currently being assessed.

1.A. Contamination

As part of its assessment of the correctness and completeness of Iran's declarations concerning its enrichment activities, the Agency is continuing to investigate the source(s) of low enriched uranium (LEU) particles, and some high enriched uranium (HEU) particles, which were found at locations where Iran has declared that centrifuge components had been manufactured, used and/or stored.

1.B. The 1987 offer

As previously reported to the Board, Iran showed the Agency in January 2005 a copy of a hand-written one-page document reflecting an offer said to have been made to Iran in 1987 by a foreign intermediary concerning the possible supply of a disassembled centrifuge (including drawings, descriptions and specifications for the production of centrifuges); drawings, specifications and calculations for a "complete plant"; and materials for 2000 centrifuge machines. The document also made reference to auxiliary vacuum and electric drive equipment; a liquid nitrogen plant; a water treatment and purification plant; a complete set of workshop equipment for mechanical, electrical and electronic support; and uranium re-conversion and casting capabilities.

On 25 January 2006, Iran reiterated that the one-page document was the only remaining documentary evidence relevant to the scope and content of the 1987 offer, attributing this to the secret nature of the programme and the management style of the Atomic Energy Organization of Iran (AEOI) at that time. Iran stated that no other written evidence exists, such as meeting minutes, administrative documents, reports, personal notebooks or the like, to substantiate its statements concerning that offer.

1.C. Genesis of the mid-1990s offer

According to Iran, there were no contacts with the network between 1987 and mid-1993. Statements made by Iran and by key members of the network about the events leading to the mid-1990s offer are still at variance with each other. In this context, Iran has been asked to provide further clarification of the timing and purpose of certain trips taken by AEOI staff members in the mid-1990s.

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* Previously issued in English only.

P-1 centrifuge component deliveries in the mid-1990s

Iran has been unable to supply any documentation or other information about the meetings that led to the acquisition of 500 sets of P-1 centrifuge components in the mid-1990s. The Agency is still awaiting clarification of the dates and contents of these shipments.

P-2 centrifuge programme

Iran still maintains that, as a result of the discussions held with the intermediaries in the mid-1990s, the intermediaries only supplied drawings for P-2 centrifuge components (which contained no supporting specifications), and that no P-2 components were delivered along with the drawings or thereafter. Iran continues to assert that no work was carried out on P-2 centrifuges during the period 1995 to 2002, and that at no time during this period did it ever discuss with the intermediaries the P-2 centrifuge design, or the possible supply of P-2 centrifuge components. In light of information available to the Agency indicating the possible deliveries of such components, which information was shared with Iran, Iran was asked in November 2005 to check again whether any deliveries had been made after 1995.

In connection with the R&D work on a modified P-2 design said by Iran to have been carried out by a contracting company between 2002 and July 2003, Iran has confirmed that the contractor had made enquiries about, and purchased, magnets suitable for the P-2 centrifuge design. The Agency is still awaiting clarification of all of Iran's efforts to acquire such magnets.

2. Uranium Metal

Iran has shown the Agency more than 60 documents said to have been the drawings, specifications and supporting documentation handed over by the intermediaries, many of which are dated from the early- to mid-1980's. Among these was a 15-page document describing the procedures for the reduction of UF_6 to metal in small quantities, and the casting of enriched and depleted uranium metal into hemispheres, related to the fabrication of nuclear weapon components. It did not, however, include dimensions or other specifications for machined pieces for such components. According to Iran, this document had been provided on the initiative of the network, and not at the request of the AEOI. Iran has declined the Agency's request to provide the Agency with a copy of the document, but did permit the Agency during its visit in January 2006 to examine the document again and to place it under Agency seal.

3. Transparency Visits and Discussions

On 1 November 2005, the Agency was given access to a military site at Parchin, with a view to providing assurances regarding the absence of undeclared nuclear material and activities at that site, where several environmental samples were taken. Final assessment is still pending the results of the analysis of those samples.

Since 2004, the Agency has been awaiting additional information and clarifications related to efforts made by the Physics Research Centre (PHRC), which had been established at Lavisan-Shian,[1] to acquire dual use materials and equipment that could be used in uranium enrichment and conversion activities. The Agency has also requested interviews with the individuals involved in the acquisition of those items.

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[1] According to Iran, the PHRC was established at Lavisan-Shian in 1989, inter alia, to "support and provide scientific advice and services to the Ministry of Defence" (see GOV/2004/60, para. 43).

On 26 January 2006, Iran presented to the Agency documentation the Agency had previously requested on efforts by Iran, which it has stated were unsuccessful, to acquire a number of specific dual use items (electric drive equipment, power supply equipment and laser equipment, including a dye laser). Iran stated that, although the documentation suggested the involvement of the PHRC, the equipment had actually been intended for a laboratory at a technical university where the Head of the PHRC worked as a professor. However, Iran declined to make him available to the Agency for an interview. The DDG-SG reiterated the Agency's request to interview the professor, explaining that it was essential for a better understanding of the envisioned and actual use of the equipment, which included balancing machines, mass spectrometers, magnets and fluorine handling equipment (equipment that appears to be relevant to uranium enrichment).

On that same day, the Agency also presented to Iran a list of high vacuum equipment purchased by the PHRC, and asked to see, and to take environmental samples from, the equipment in situ. The following day, some of the high vacuum equipment on the Agency's list was presented at a technical university, and environmental samples were taken from it.

On 26 January 2006, Iran provided additional clarification about its efforts in 2000 to procure some other dual use material (high strength aluminium, special steel, titanium and special oils), as had been discussed in January 2005. High strength aluminium was presented to the Agency, and environmental samples were taken therefrom. Iran stated that the material had been acquired for aircraft manufacturing, but had not been used because of its specifications. Iran agreed to provide additional information on inquiries concerning the purchase of special steels, titanium and special oils. Iran also presented information on Iran's acquisition of corrosion resistant steel, valves, and filters, which were made available to the Agency on 31 January 2006 for environmental sampling.

On 5 December 2005, the Agency reiterated its request for a meeting to discuss information that had been made available to the Agency about alleged undeclared studies, known as the Green Salt Project, concerning the conversion of uranium dioxide into UF_4 ("green salt"), as well as tests related to high explosives and the design of a missile re-entry vehicle, all of which could have a military nuclear dimension and which appear to have administrative interconnections. On 16 December 2005, Iran replied that the "issues related to baseless allegations." Iran agreed on 23 January 2006 to a meeting with the DDG-SG for the clarification of the Green Salt Project, but declined to address the other topics during that meeting. In the course of the meeting, which took place on 27 January 2006, the Agency presented for Iran's review a copy of a process flow diagram related to bench scale conversion and communications related to the project. Iran reiterated that all national nuclear projects are conducted by the AEOI, that the allegations were baseless and that it would provide further clarifications later.

4. Suspension

The Agency has continued to verify and monitor all elements of Iran's voluntary suspension of enrichment related and reprocessing activities.

In a letter dated 3 January 2006, Iran informed the Agency that it had decided to resume, as from 9 January 2006, "those R&D on the peaceful nuclear energy programme which ha[d] been suspended as part of its expanded voluntary and non-legally binding suspension" (GOV/INF/2006/1). On 7 January 2006, the Agency received a letter from Iran requesting that the Agency remove seals applied at Natanz, Farayand Technique and Pars Trash for the monitoring of suspension of enrichment related activities (see GOV/INF/2006/2). The seals were removed by Iran on 10 and 11 January 2006 in the presence of Agency inspectors.

Since the removal of the seals, Iran has started what it refers to as "small scale R&D". As of 30 January 2006, Agency inspectors had not seen any new installation or assembly of centrifuges, or the feeding of UF_6 material for enrichment. However, substantial renovation of the gas handling system is underway at the Pilot Fuel Enrichment Plant (PFEP) at Natanz, and quality control of components and some rotor testing is being conducted at Farayand Technique and Natanz. Due to the fact that all centrifuge-related raw materials and components are without IAEA seals, the Agency's supervision of the R&D activities being carried out by Iran cannot be effective except at PFEP, where containment and surveillance measures are being applied for the enrichment process. The two cylinders at Natanz containing UF_6, from which seals had been removed on 10 January 2006, were again placed under Agency containment and surveillance on 29 January 2006.

The uranium conversion campaign which commenced at the Uranium Conversion Facility (UCF) in Esfahan on 16 November 2005 is continuing and is expected to end in March 2006. All UF_6 produced at UCF thus far has remained under Agency containment and surveillance.

Using satellite imagery, the Agency has continued to monitor the ongoing civil engineering construction of the Iran Nuclear Research Reactor (IR-40) at Arak.

IAEA
International Atomic Energy Agency

Board of Governors

GOV/INF/2006/1
Date: 3 January 2006

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Communication dated 3 January 2006 received from the Permanent Mission of the Islamic Republic of Iran to the Agency

Report by the Director General

The Secretariat of the Agency received on 3 January 2006 a Note Verbale of the same date from the Permanent Mission of the Islamic Republic of Iran in which Iran informed the Agency that "in benefiting full privilege and inalienable rights for research and development on nuclear energy as recognised in article III of the Agency Statute and article IV of the NPT, the Atomic Energy Organization of Iran (AEOI) has decided to resume from 9 January 2006 those R&D on the peaceful nuclear energy programme which has been suspended as part of its expanded voluntary and non-legally binding suspension. The Agency is thus requested to take necessary and timely preparation in this regard. It is to be noted that the said R&D will be conducted in accordance with Iran's Safeguards Agreement with the IAEA."

The Secretariat is in the process of seeking clarifications from Iran as to the implications of the Note Verbale.

The Director General will continue to report to the Board as appropriate.

IAEA
International Atomic Energy Agency

Board of Governors

GOV/2005/87
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Item 3(c) of the provisional agenda
(GOV/2005/81)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Report by the Director General

1. On 24 September 2005, the Board of Governors adopted a resolution (GOV/2005/77) in which, inter alia, it urged the Islamic Republic of Iran (hereinafter referred to as Iran), in order to help the Director General to resolve outstanding questions and provide the necessary assurances:

- To implement transparency measures, as requested by the Director General in his report, which extend beyond the formal requirements of the Safeguards Agreement and Additional Protocol, and include access to individuals, documentation relating to procurement, dual use equipment, certain military owned workshops and research and development locations;
- To re-establish full and sustained suspension of all enrichment-related activity, as in GOV/2005/64, and reprocessing activity;
- To reconsider the construction of a research reactor moderated by heavy water;
- Promptly to ratify and implement in full the Additional Protocol;
- Pending completion of the ratification of the Additional Protocol to continue to act in accordance with the provisions of the Additional Protocol, which Iran signed on 18 December 2003.

2. This progress report builds on the previous reports[1] of the Director General to the Board of Governors on issues related to the implementation of the Agreement between Iran and the Agency for

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[1] The initial report to the Board of Governors on this matter was provided by the Director General orally at the Board's meeting on 17 March 2003. The Director General has since then submitted eleven written reports to the Board: GOV/2003/40, dated 6 June 2003, GOV/2003/63, dated 26 August 2003; GOV/2003/75, dated 10 November 2003, GOV/2004/11, dated 24 February 2004; GOV/2004/34, dated 1 June 2004, and Corr.1, dated 18 June 2004, GOV/2004/60, dated 1 September 2004; GOV/2004/83, dated 15 November 2004, INFCIRC/648, dated 1 August 2005; GOV/2005/61, dated 8 August 2005, GOV/2005/62, dated 10 August 2005; and GOV/2005/67, dated 2 September 2005. In addition, the Deputy Director General for Safeguards made oral statements to the Board on 1 March 2005 (GOV/OR.1119) and on 16 June 2005 (GOV/OR.1130).

the Application of Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (the Safeguards Agreement[2]).

A. Developments since September 2005

A.1. Contamination

3. The Agency is continuing to analyse the source(s) of low enriched uranium (LEU) particles, and some high enriched uranium (HEU) particles, which were found in Iran with a view to assessing the correctness and completeness of Iran's declarations concerning its enrichment activities (see paras 9 and 10 of GOV/2005/67). The analysis of the environmental samples collected at a location in another Member State where, according to Iran, the centrifuge components had been stored by the procurement network in the mid-1990s prior to their shipment to Iran (see para. 11 of GOV/2005/67), did not indicate any traces of nuclear material.

A.2. Enrichment Programme

4. In October and November 2005, a number of meetings took place during which further documentation said to have been provided to Iran by the procurement network was made available to the Agency, and the Agency was able to interview two individuals (not previously available to the Agency) who had been involved in Iran's discussions with the procurement network.

A.2.1. The 1987 offer

5. As previously reported to the Board, in January 2005 Iran showed to the Agency a copy of a hand-written one-page document reflecting an offer said to have been made to Iran in 1987 by a foreign intermediary for certain components and equipment (see paras 14 and 15 of GOV/2005/67).[3] Iran stated that only some components of one or two disassembled centrifuges, and supporting drawings and specifications, were delivered by the procurement network, and that a number of other items of equipment referred to in the document were purchased directly from other suppliers. Most of these components and items were included in the October 2003 declaration by Iran to the Agency.

6. The documents recently made available to the Agency related mainly to the 1987 offer; many of them dated from the late 1970s and early to mid-1980s. The documents included: detailed drawings of the P-1 centrifuge components and assemblies; technical specifications supporting component manufacture and centrifuge assembly; and technical documents relating to centrifuge operational performance. In addition, they included cascade schematic drawings for various sizes of research and development (R&D) cascades, together with the equipment needed for cascade operation (e.g. cooling water circuit needs and special valve consoles). The documents also included a drawing showing a cascade layout for 6 cascades of 168 machines each and a small plant of 2000 centrifuges arranged in the same hall. Also among the documents was one related to the procedural requirements for the reduction of UF_6 to metal in small quantities, and on the casting and machining of enriched, natural and depleted uranium metal into hemispherical forms, with respect to which Iran stated that it had

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[2] INFCIRC/214.

[3] The document contained a list including: a disassembled centrifuge, including drawings, descriptions and specifications for production of centrifuges; drawings, specifications and calculations for a "complete plant"; and materials for 2000 centrifuge machines. The document also made reference to: auxiliary vacuum and electric drive equipment; a liquid nitrogen plant; a water treatment and purification plant; a complete set of workshop equipment for mechanical, electrical and electronic support; and uranium reconversion and casting capabilities.

been provided on the initiative of the procurement network, and not at the request of the Atomic Energy Organization of Iran (AEOI).

7. The Agency is assessing all the documentation referred to above and comparing it with, inter alia, documentation from other sources.

A.2.2. Genesis of the mid-1990s offer

8. Very little new information has been made available regarding the events preceding the mid-1990s offer. Iran has maintained that no documentation on the offer exists apart from the shipping documents confirming the delivery of the P-1 components during the 1994–1995 period. Iran has provided no additional information or documentation to support its statement that it did not pursue any work on the P-2 design between 1995 and 2002.

9. As indicated in earlier reports to the Board, Iran has stated that, between 2002 and 2003, a contracting company had briefly carried out some R&D work on a modified P-2 design, but that this had been terminated in July 2003. Iran re-confirmed that, as part of this R&D work, the contractor had purchased some magnets suitable for the P-2 centrifuge design, and made some additional inquiries regarding magnets. Since September 2005, Iran has provided documentation concerning purchases by the contractor of copper aluminium and by the P-1 team of maraging steel and special oil which were also made available to the contractor. The Agency's assessment of these purchases, and the quantities delivered, is continuing with the assistance of Member States.

A.2.3. Shipping documents and other documentation

10. In addition to the documentation referred to above, since the last report to the Board, Iran also provided the Agency with access to a substantial amount of information and documentation relevant to its procurement efforts in the late 1980s and early 1990s, along with more details on the 1994–1995 deliveries. This information, taken together with information obtained through the interviews held in Iran, the Agency's findings and other information supplied to the Agency thus far, seems to be consistent with Iran's declarations of what had been procured in the late 1980s and early 1990s for the first stage of the P-1 R&D programme of the AEOI. Iran has been asked to provide some additional procurement documents in order to enable the Agency to complete its assessment in this regard.

A.2.4. Technical discussions between Iran and the intermediaries

11. Iran has maintained that, after the meetings leading to the 1987 offer and the actual receipt of components and documentation, no contacts were made between Iranian officials and the procurement network before 1993. Iran reiterated that the contact for the mid-1990s offer had been an initiative by the network, and not by Iran.

12. Iran has previously confirmed that, following the mid-1990s offer, up to ten meetings were held with the intermediaries during the period 1996 to 1999. Information supporting this statement was supplied by one of the individuals interviewed by the Agency. Iran has stated that these meetings were all related to discussions about the poor quality of many of the P-1 components that had been supplied to Iran and to obtaining answers to specific technical questions arising from Iran's efforts to operate the P-1 centrifuges. Iran has maintained that at no time during this period did it discuss the P-2 centrifuge design, nor did Iran discuss the possible supply of P-2 centrifuge components, sub-assemblies or rotors.

A.3. Other Implementation Issues

13. With reference to the other aspects of Iran's past nuclear programme, as identified in para. 48 of GOV/2005/67, there are no new developments to report with respect to Iran's uranium mining activities (see paras 26–31 of GOV/2005/67) or with respect to Iran's activities involving polonium and beryllium (see para. 34 of GOV/2005/67).

14. The Agency is awaiting from IAEA network laboratories the results of the analyses of plutonium samples taken in August 2005 to complete its final assessment of Iran's plutonium experiments (see paras 21–25 of GOV/2005/67).

A.4. Implementation of the Additional Protocol

15. As undertaken in its letter to the Agency of 10 November 2003, Iran has continued to act as if its Additional Protocol were in force. Since September 2005 the Agency has conducted three complementary accesses.

A.5. Transparency Visits and Discussions

16. On 1 November 2005, following a meeting held on 30 October 2005 between Mr. Larijani, the Secretary of the Supreme National Security Council of Iran, and the Deputy Director General for Safeguards (DDG-SG), the Agency was given access to the buildings requested within the area of interest at Parchin (see para. 41 of GOV/2005/67), in the course of which environmental samples were taken. The Agency did not observe any unusual activities in the buildings visited. Its final assessment is pending the results of the environmental sample analysis. There have been no new developments with regard to questions and access related to the Lavisan-Shian site (see paras 37–40 of GOV/2005/67).

A.6. Suspension

17. The Agency has continued to monitor installations related to the uranium gas centrifuge and laser enrichment programmes, and has not observed any inconsistency with Iran's voluntary undertaking not to carry out any enrichment activities.

18. On 24 October 2005, Iran informed the Agency that the uranium conversion campaign begun in August 2005 at the Uranium Conversion Facility (UCF) would end around 1 November 2005, and that another campaign with 150 drums would start after a one-week maintenance period (GOV/INF/2005/13). Feeding of yellow cake to process started on 16 November 2005. All UF_6 so far produced at UCF has remained under Agency containment and surveillance measures.

19. In November 2005, the Agency carried out a design information verification visit at the Iran Nuclear Research Reactor (IR-40) at Arak, during which it was noted that the civil engineering construction of the reactor building was continuing.

B. Current overall assessment

20. In the September 2005 report to the Board of Governors, it was noted that, in light of the difficulty of establishing a definitive conclusion with respect to all of the contamination, it was important to make progress on the issue of the scope and chronology of Iran's P-1 and P-2 programmes (see paras 44–47 of GOV/2005/67). Since that time, Iran has been more forthcoming in providing access to additional documentation related to the 1987 offer and permitting interviews with individuals who had been involved in discussions with the procurement network. However, there still remain issues to be resolved in connection with the genesis of the mid-1990s offer. The Agency is still

seeking additional assurance that no P-2 programme was conducted between 1995 and 2002. The Agency is currently reviewing the new information provided by Iran on the P-1 and P-2 enrichment programmes and has emphasized to Iran the importance of providing the additional requested supporting documentation.

21. As also noted in the previous report to the Board, in order to clarify some of the outstanding issues related to Iran's enrichment programme, Iran's full transparency is indispensable and overdue. Transparency measures should include the provision of information and documentation related to the procurement of dual use equipment, and permitting visits to relevant military owned workshops and R&D locations associated with the Physics Research Centre and the Lavisan-Shian site. In this regard, the Agency welcomes the access provided to the Parchin site. The Agency, however, is still awaiting additional information and permission to undertake additional visits. These should also include interviews on the acquisition of certain dual use materials and equipment, and the taking of environmental samples from the above locations.

22. The Secretariat will continue its investigation of all relevant information available to it as well as of outstanding issues pertaining to Iran's nuclear programme. The Director General will continue to report to the Board as appropriate.

IAEA
International Atomic Energy Agency

Board of Governors

GOV/INF/2005/13
Date: 2 November 2005

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Communication dated 24 October 2005 received from the Permanent Mission of the Islamic Republic of Iran to the Agency

Report by the Director General

The Secretariat of the Agency received on 25 October 2005 a Note Verbale dated 24 October 2005 from the Permanent Mission of the Islamic Republic of Iran forwarding a communication dated 24 October 2005 from the Atomic Energy Organization of Iran.

In that communication, the Agency was informed that the operator of the Uranium Conversion Facility had announced that "current verified U3O8 drums will last until 1st November 2005. After finishing the operation, each unit will have one week overhaul maintenance and the next campaign will start with 150 UOC drums."

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International Atomic Energy Agency

Board of Governors

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Item 6(d) of the provisional agenda
(GOV/2005/57)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Report by the Director General

1. A meeting of the Board of Governors was held from 9 to 11 August 2005 to discuss the implementation of the Agreement between the Islamic Republic of Iran (hereinafter referred to as Iran) and the Agency for the Application of Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) (the Safeguards Agreement[1]).

2. On 11 August 2005, the Board of Governors adopted a resolution (GOV/2005/64) in which it, inter alia:

- Expressed serious concern at the 1 August 2005 notification to the IAEA that Iran had decided to resume the uranium conversion activities at the Uranium Conversion Facility (UCF) in Esfahan, at the Director General's report that on 8 August Iran had started to feed uranium ore concentrate into the first part of the process line at UCF and at the Director General's report that on 10 August Iran had removed the seals on the process lines and the UF_4 at that facility;
- Underlined the importance of rectifying the situation resulting from the developments reported by the Director General and also of allowing for further discussions in relation to that situation;
- Urged Iran to re-establish full suspension of all enrichment related activities including the production of feed material, including through tests or production at UCF, on the same voluntary, non-legally binding basis as requested in previous Board resolutions, and to permit the Director General to re-instate the seals that had been removed at that facility;
- Requested the Director General to continue to monitor closely the situation and to inform the Board of any further developments as appropriate; and
- Requested the Director General to provide a comprehensive report on the implementation of Iran's NPT Safeguards Agreement and this resolution by 3 September 2005.

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[1] INFCIRC/214.

3. Since March 2003, the Director General has been reporting to the Board of Governors on issues related to the implementation of Iran's Safeguards Agreement.[2] The present report builds upon the previous reports.

A. Findings as of November 2004

4. In the comprehensive report of the Director General to the Board of Governors dated 15 November 2004 (GOV/2004/83), it was concluded, on the basis of all information available to the Agency as of that date, that Iran had failed in a number of instances over an extended period of time to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material, its processing and its use, as well as the declaration of facilities where such material had been processed and stored. In that report, these failures, as assessed in the light of the available information, were summarized as follows:

a. Failure to report:

  (i) the import of natural uranium in 1991, and its subsequent transfer for further processing;

  (ii) the activities involving the subsequent processing and use of the imported natural uranium, including the production and loss of nuclear material where appropriate, and the production and transfer of waste resulting therefrom;

  (iii) the use of imported natural UF_6 for the testing of centrifuges at the Kalaye Electric Company workshop in 1999 and 2002, and the consequent production of enriched and depleted uranium (DU);

  (iv) the import of natural uranium metal in 1993 and its subsequent transfer for use in laser enrichment experiments, including the production of enriched uranium, the loss of nuclear material during these operations and the production and transfer of resulting waste;

  (v) the production of UO_2, UO_3, UF_4, UF_6 and ammonium uranyl carbonate (AUC) from imported depleted UO_2, depleted U_3O_8 and natural U_3O_8, and the production and transfer of resulting wastes; and

  (vi) the production of natural and depleted UO_2 targets at the Esfahan Nuclear Technology Centre (ENTC) and their irradiation in the Tehran Research Reactor (TRR), the subsequent processing of those targets, including the separation of plutonium, the production and transfer of resulting waste, and the storage of unprocessed irradiated targets at the Tehran Nuclear Research Centre (TNRC).

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[2] The initial report to the Board of Governors on this matter was provided by the Director General orally at the Board's meeting on 17 March 2003. The Director General has since then submitted ten written reports to the Board: GOV/2003/40, dated 6 June 2003; GOV/2003/63, dated 26 August 2003; GOV/2003/75, dated 10 November 2003; GOV/2004/11, dated 24 February 2004; GOV/2004/34, dated 1 June 2004, and Corr.1, dated 18 June 2004; GOV/2004/60, dated 1 September 2004; GOV/2004/83, dated 15 November 2004; INFCIRC/648, dated 1 August 2005; GOV/2005/61, dated 8 August 2005; and GOV/2005/62, dated 10 August 2005. In addition, the Deputy Director General for Safeguards made oral statements to the Board on 1 March 2005 (GOV/OR.1119) and on 16 June 2005 (GOV/OR.1130).

b. Failure to declare:

   (i) the pilot enrichment facility at the Kalaye Electric Company workshop; and

   (ii) the laser enrichment plants at TNRC and the pilot uranium laser enrichment plant at Lashkar Ab'ad.

c. Failure to provide design information, or updated design information, for:

   (i) the facilities where the natural uranium imported in 1991 (including wastes generated) was received, stored and processed (the Jabr Ibn Hayan Multipurpose Laboratories at TNRC (JHL); TRR; ENTC; waste storage facility at Esfahan and Anarak);

   (ii) the facilities at ENTC and TNRC where UO_2, UO_3, UF_4, UF_6 and AUC from imported depleted UO_2, depleted U_3O_8 and natural U_3O_8 had been produced;

   (iii) the waste storages at Esfahan and at Anarak, in a timely manner;

   (iv) the pilot enrichment facility at the Kalaye Electric Company workshop;

   (v) the laser enrichment plants at TNRC and Lashkar Ab'ad, and locations where resulting wastes had been processed and stored, including the waste storage facility at Karaj; and

   (vi) TRR, with respect to the irradiation of uranium targets, and the facility at TNRC where plutonium separation had taken place, as well as the waste handling facility at TNRC.

d. Failure on many occasions to cooperate to facilitate the implementation of safeguards, as evidenced by extensive concealment activities.

5. As corrective actions, Iran:

a. Submitted inventory change reports relevant to imports, transfers, domestic receipts and shipments, losses and discards of nuclear material;

b. Provided physical inventory listings and material balance reports with respect to all declared nuclear material, and presented the available material for Agency verification;

c. Submitted declarations with respect to the pilot enrichment facility at the Kalaye Electric Company workshop, the laser enrichment plants at TNRC and Lashkar Ab'ad and the waste storages at Esfahan and Anarak; and

d. Provided design information with respect to the facilities identified above (the facilities located at TNRC and ENTC).

6. As a result of these corrective actions and other activities, the Agency was able by November 2004 to confirm certain aspects of Iran's declarations (related to conversion activities and laser enrichment), which, as indicated to the Board, would be followed up as matters of routine safeguards implementation under the Safeguards Agreement and Additional Protocol.

7. As reported to the Board of Governors in March 2005, Iran failed to report to the Agency in a timely manner certain underground excavation activities that were already underway in December 2004 at the UCF at Esfahan. Although Iran submitted the necessary design information in December 2004, Iran should have provided such information to the Agency at the time the decision

was taken to authorize or carry out such construction, in accordance with the Safeguards Agreement Subsidiary Arrangements.

8. No additional failures have been identified. Iran has, however, provided some new information with respect to the dates of the plutonium research activities that is at variance with some of the dates provided earlier (see discussion below). As in November 2004, while there are a number of other matters requiring follow-up, the two important outstanding issues relevant to the Agency's efforts to provide assurance that there is no undeclared nuclear material and that there are no undeclared enrichment activities in Iran are: the origin of LEU and HEU[3] particle contamination found at various locations in Iran; and the extent of Iran's efforts to import, manufacture and use centrifuges of both the P-1 and P-2 designs.

B. Developments since November 2004

B.1. Contamination

9. As a vital part of its investigation into Iran's enrichment programme, the Agency has conducted extensive environmental sampling at locations where Iran has declared that centrifuge components were manufactured, used and/or stored, with a view to assessing the correctness and completeness of Iran's declarations concerning its enrichment activities.[4]

10. Analysis of these samples has revealed particles of LEU and HEU indicative of types of nuclear material that are not included in Iran's inventory of declared nuclear material, and has thus called into question the completeness of Iran's declarations about its centrifuge enrichment activities. The Iranian authorities have attributed the presence of these particles to contamination originating from imported centrifuge components. In that context, Iran has stated that it has not enriched uranium beyond 1.2% U-235 using centrifuges.

11. In January 2005, an Agency team re-visited locations in a Member State where, according to Iran, the centrifuge components imported by Iran had been stored by the supply network prior to their shipment to Iran. Additional samples were taken in March 2005 at one of the locations. The analysis of the environmental samples collected at these locations is still in progress.

12. On 21 May 2005, the Agency received from another Member State a number of centrifuge components, environmental sampling of which was thought might provide information on the origin of the LEU and HEU particle contamination found at various locations in Iran. The analysis of swipe samples taken from those components, which was carried out at the Agency's Safeguards Analytical Laboratory (SAL), was completed in early August 2005. Based on the information currently available to the Agency, the results of that analysis tend, on balance, to support Iran's statement about the foreign origin of most of the observed HEU contamination.

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[3] High enriched uranium (HEU) is uranium enriched to 20% or above in the isotope U-235; low enriched uranium (LEU) is uranium enriched to between 0.72% and less than 20% U-235.

[4] The most important observations with respect to the analytical results from the environmental sampling, as of 15 November 2004, were summarized in paras 36–41 of the Director General's November 2004 report to the Board.

B.2. Enrichment Programme

13. As explained by the Deputy Director General for Safeguards (DDG-SG) in March 2005, there have been developments since November 2004 in four areas related to the Agency's verification of Iran's P-1 centrifuge enrichment programme, specifically in connection with: (a) a 1987 offer for centrifuge related design, technology and sample components; (b) the genesis of the mid-1990s offer for P-1 centrifuge documentation and components for 500 centrifuges; (c) shipping documents and other documentation related to the delivery of items in connection with the mid-1990s offer; and (d) technical discussions held between Iran and the intermediaries concerning centrifuge enrichment. These developments, as well as the status of the Agency's inquiries about Iran's P-2 programme, are addressed below.

B.2.1. The 1987 offer

14. During a meeting on 12 January 2005 in Tehran, Iran showed the Agency a handwritten one-page document reflecting an offer said to have been made to Iran in 1987 by a foreign intermediary. The document suggests that the offer was for the delivery of: a sample machine (disassembled), including drawings, descriptions and specifications for production; drawings, specifications and calculations for a "complete plant"; and materials for 2000 centrifuge machines. The document also reflects an offer to provide auxiliary vacuum and electric drive equipment and uranium re-conversion and casting capabilities. Iran stated that only some of these items had been delivered, and that all of those items had been declared to the Agency. Iran further stated that the intermediaries had offered the re-conversion unit with casting equipment on their own initiative and that, as the Atomic Energy Organization of Iran (AEOI) had not requested it, the AEOI had not received it.

15. The Agency has repeatedly asked to have access to, and copies of, original documentation related to the 1987 offer. Iran has maintained that the only document that exists reflecting the 1987 offer is the handwritten one-page document. Iran has also reiterated its previous statement that it had not received the re-conversion unit, but has agreed to continue its search for additional supporting documentation on this and other items included in the offer.

B.2.2. Genesis of the mid-1990s offer

16. Iran has informed the Agency that there is no written document reflecting the mid-1990s offer, made initially to an Iranian company unrelated to AEOI, for the delivery of P-1 centrifuge documentation and components for 500 centrifuges. According to Iran, an employee of that company (said by Iran to have been set up to purchase computer software and hardware for the State Organization for Management and Planning (OMP) was approached with an oral offer from the network. This information was conveyed to the head of the OMP, who, according to Iran, realized that the OMP did not have a mandate for the transaction, and reported it to higher authorities. The President of the AEOI was made aware of the offer, which resulted in renewed contacts in 1993 between the AEOI and the network intermediaries.

B.2.3. Shipping documents and other documentation

17. The Agency has sought from Iran access to documentation which supports Iran's declarations concerning the number of shipments of enrichment related equipment received by Iran, and the specific contents of those shipments. In January 2005, Iran provided the Agency with copies of a number of shipping documents indicating four shipments between 1994 and 1995. In a letter dated 14 April 2005, the Agency asked Iran for permission to review the original folder containing the 1994 shipping documents and to be provided with supporting documents reflecting the content of the shipments made in the 1994 consignments. In August 2005, Iran showed the Agency the originals of

the shipping documents, as well as customs clearance sheets relevant to the 1994/1995 shipments. However, these documents did not provide additional details about the actual contents of the shipments. The Agency has reiterated its request for more information about the contents, and in particular for access to unpacking and storage documents. While Iran has stated that very few such records had been kept in those days, it has agreed to search further for such information.

18. From the shipping documents presented to the Agency in January 2005, it appeared that the first deliveries of the P-1 components started in January 1994, i.e. before what had previously been declared as the first meeting, in October 1994, of the two AEOI representatives with the network intermediaries. In its letter of 6 April 2005, Iran stated that, having checked the service passport of one of the AEOI representatives, "it is clear that he had made two trips relating to the matter in August and December 1993." Since this was not consistent with the earlier information provided by that individual during his discussions with the Agency, the Agency asked to see original supporting documentation (e.g. passports) of the two Iranian representatives who had participated in the meetings with the intermediaries. In August 2005, Iran allowed the Agency to review the service passport of one of the Iranian representatives, which contained stamps appearing to corroborate Iran's statement regarding the two trips in 1993. Iran promised to provide further clarification about the trips said by that individual to have taken place in 1994, and to provide supporting documentation for such clarification.

B.2.4. Technical discussions between Iran and the intermediaries

19. The Agency still needs to understand what contacts took place during the period 1987 through 1993 between Iran and the intermediaries and why P-1 centrifuge design documents similar to those that had been provided in 1987 were delivered again in connection with the offer made around 1994. This is important for establishing the chronology and sequence of events associated with the development of Iran's enrichment programme, in particular with a view to ensuring that there has been no other development or acquisition of enrichment design, technology or components by Iran. The Agency also has inquired about other subsequent contacts between Iran and the intermediaries (from 1994 to the present). In its communication received on 8 June 2005, Iran stated that, apart from the meetings and discussions about which Iran had already informed the Agency, no other discussions on centrifuge enrichment had taken place.

B.2.5. The P-2 programme

20. Another aspect of the Agency's investigation is related to Iran's statement that it did not pursue any work on the P-2 design between 1995 and 2002. As reported in November 2004, Iran has stated that no work was carried out on the P-2 design (or any centrifuge design other than the P-1 design) prior to 2002. Iran has said that, due a shortage in professional resources and changes in the management of the AEOI, priority had been placed at that time on resolving difficulties being encountered by Iran in connection with the P-1 centrifuge. The reasons given by Iran for the apparent gap between 1994/1995 (when the P-2 design was said to have been received) and 2002, and the evidence provided to date in support thereof, do not yet provide sufficient assurance that no related activities were carried out during that period, particularly given that the individual contracted to work with the P-2 design was able to make modifications necessary for composite rotors within a short period after early 2002 when, according to Iran, he had seen the drawings for the first time.[5] Iran has been requested to provide more information, along with any supporting documentation, relevant to the P-2 programme, in particular with regard to the scope of the original offer related to the P-2 design and Iran's acquisition of items in connection with that programme.

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[5] See GOV/2004/83, paras 42–48, for a more complete detailing of this issue.

B.3. Plutonium Experiments

21. As indicated in previous reports to the Board, the Agency has been pursuing with Iran the issue of the date of its plutonium separation experiments, which Iran initially said had begun in 1988 and were completed in 1993. Iran also stated that no plutonium had been separated since then.[6]

22. The result of the Agency's analysis of plutonium solutions sampled by it in September 2004 confirmed the Agency's earlier finding that the age of the plutonium solutions in the bottles appeared to be less than the declared 12–16 years, indicating that the plutonium could have been separated after 1993. During follow up discussions with Iran in April 2005, Iran told the Agency that, in 1995, the plutonium nitrate solution contained in one of the two bottles said to have been a result of the experiments had been purified and a plutonium disk had been produced as a result for alpha spectroscopy, and that, in 1998, the plutonium solution in the other bottle had been purified and another plutonium disk had been produced. Following these discussions, at the request of the Agency, the plutonium disks were shipped to SAL for further analysis to determine the exact isotopic composition of the plutonium.

23. In a letter to the Agency dated 17 June 2005 referring to the statement by the DDG-SG, Iran explained that there was a clear distinction between the date of termination of the research project on plutonium and the dates of the other activities, such as the ones related to purification and related waste management of the liquid, which it had not considered as part of the main research project. Iran reiterated that the "research project had been terminated in 1993" and added, "That is, no more samples were sent for irradiation to the research reactor for the purpose of [plutonium] production and subsequent [plutonium] separation."[7]

24. With the cooperation of Iran, the Agency was able, between 1 and 9 August 2005, to conduct detailed verification of the unprocessed irradiated UO_2 targets stored in four containers. A preliminary assessment of the data collected and the measurements performed during that verification seems to corroborate Iran's declaration with regard to the quantity of uranium present in the containers, although the total number of targets found in those containers was much higher than had been declared by Iran. In a letter dated 24 August 2005, Iran provided further detail about the numbers of targets.

25. A final assessment of Iran's plutonium research activities must await the results of the destructive analysis of the disks and targets.

B.4. Uranium Mining and Concentration

26. As indicated by the DDG-SG in his statement to the Board on 16 June 2005, while there are no indications of undeclared mining or milling activities at Gchine, the Agency has been trying to achieve a better understanding of the complex arrangements governing the past and current administration of the Gchine mine and mill. In particular, the Agency wished to investigate further how a turn-key project for a uranium ore processing plant could have been implemented by a newly founded company, described as having had limited experience in uranium ore processing, in such a relatively short period of time. In particular, the Agency has focused on the period between 2000 and mid-2001,

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[6] As indicated in the November 2004 report to the Board, in November 2003, the Agency took samples from two bottles containing plutonium solutions resulting from the experiments, and placed under Agency seal a number of disks which had been produced from the solutions. In September 2004, the Agency took a second set of samples for further analysis using different analytical techniques at different laboratories.

[7] The Agency's current understanding of Iran's activities in connection with the plutonium separation experiments is set out in Annex 1 to this report.

during which time, according to Iran, the company had been able to design, procure, build and test the grinding process line for the mill.

27. In response to the Agency's request, Iran, in April 2005, showed the Agency, and provided an oral translation of, a copy of a contract dated 13 June 2000. The Agency was also shown a comprehensive set of "as built" drawings provided by the engineering company to the AEOI, as well as a number of other documents and drawings.

28. During a meeting in Iran from 13 to 18 August 2005, the Agency requested to speak with the individual who had previously been in charge of the Gchine project, as well as to the AEOI representative currently in charge of the project. The Agency was only able to meet with the current AEOI representative, who had assumed responsibility for the project in 2002. The AEOI representative provided a chronology of the construction of the uranium ore concentration plant, and in particular, of the design and construction of the grinding process line, stating that procurement of parts for that line had been started in September 2000, that the civil engineering construction had begun in February 2001 and that the equipment was first tested in April 2001.

29. During the meeting, files containing drawings and documents related to the Gchine mine ore processing activities were shown to the Agency. Most of the files were those which had been shown to the Agency in April 2005, and consisted of the final "as built" drawings. Only some of the files contained originals of drawings related to the first attempts to design and construct the grinding process line. In these latter documents, the names of the persons who had designed, drawn, checked or approved the drawings, and the name of the company that had prepared the drawings, along with project numbers and dates, were blacked out. Iran explained that "the coverage of names was done to protect the commercial secret."

30. During the August 2005 meeting, Iran also showed the Agency some of the delivery documents (receipts) for items purchased off the shelf, which matched the time line declared by Iran, as well as examples of purchase orders placed around 2002 with various subcontractors. According to Iran, however, no purchase orders or contracts existed for the procurement of equipment for the grinding process line. Iran explained that, since the company had just started in business in 2000, the company had not had a great deal of experience and had purchased most of the equipment for the grinding process off the shelf with the intention of assembling that part of the facility by itself on site, but that, after the first unsuccessful cold testing, the company had changed its operating practice and had subcontracted for the production of parts for the process lines. According to Iran, this explained the relative abundance of such documentation for the subsequent development of the process line as compared with the paucity of such documentation for the first efforts.

31. In addition to the above questions associated with the chronology, the Agency is still trying to acquire a better understanding about why no work was carried out at the Gchine site between 1993 and 2000. Iran has stated that, during that period, research and development experiments on Gchine ore were carried out at a TNRC laboratory.

B.5. Other Implementation Issues

32. As described in the Director General's November 2004 report, Iran brought into operation in 1985 a Fuel Fabrication Laboratory (FFL) at Esfahan (which is still in operation), about which it informed the Agency in 1993 and for which design information was provided in 1998. Iran is also building a Zirconium Production Plant at Esfahan. Construction of the Fuel Manufacturing Plant at Esfahan, which is scheduled to be commissioned in 2007, was started in 2004. There are no other new developments to report with respect to Iran's fuel fabrication activities. Further follow up of these activities will be carried out as a routine safeguards implementation matter.

33. Iran is in the process of constructing a heavy water research reactor (IR-40) at Arak (planned to go into operation in 2014) and a heavy water production plant (HWPP) at Arak. As indicated in the November 2004 report, the Agency has requested additional information about Iran's efforts to acquire equipment for hot cells for the IR-40. However, no new information has been received concerning hot cell equipment since that time. In March 2005, Agency inspectors visited the Arak site to carry out design information verification (DIV), and noted that construction of the IR-40 building had been started. The March 2005 visit also included complementary access to HWPP, which is currently being commissioned. The Agency will continue to monitor Iran's heavy water reactor programme as a routine safeguards implementation matter.

34. Iran's activities involving polonium extraction, and the Agency's findings with respect thereto, were discussed in paragraphs 79–84 of the November 2004 report.[8] As indicated in that report, the issue is of interest to the Agency since polonium-210 can be used not only for certain civilian applications, but also, in conjunction with beryllium, for military purposes (specifically, as a neutron initiator in some designs of nuclear weapons). There are no new developments to report in connection with the polonium separation experiments. The Agency has, however, investigated evidence provided to it of attempts by Iran to acquire beryllium metal, and has been able to confirm that the attempts indicated in that evidence were not successful.

B.6. Cooperation in the Implementation of the Safeguards Agreement and Additional Protocol

35. The Additional Protocol to Iran's Safeguards Agreement was signed on 18 December 2003. According to Iran, entry into force of the Additional Protocol will require ratification, which has not yet taken place. Notwithstanding, as undertaken in its letter to the Agency of 10 November 2003, Iran has continued to act as if its Additional Protocol is in force.

36. As noted in the Director General's November 2004 report, since December 2003, Iran has facilitated, in a timely manner, Agency access under its Safeguards Agreement and Additional Protocol to nuclear materials and facilities, as well as to other locations in the country, and has permitted the Agency to take environmental samples as requested by the Agency. Iran still maintains some restrictions on the issuance of multiple entry visas to designated inspectors. As of August 2005, Iran had agreed to provide fifteen designated inspectors with such visas.

B.7. Transparency Visits and Discussions

37. Iran has, since October 2003, provided the Agency upon its request, and as a transparency measure, access to certain additional information and locations beyond that required under its Safeguards Agreement and Additional Protocol. A summary of the relevant developments through November 2004 is set out in paragraphs 96–105 of the 15 November 2004 report to the Board.

38. In connection with the Lavisan-Shian site and the two whole body counters (WBCs) that had been located there, as indicated in the November 2004 report to the Board, although Iran's description of events concerning the WBCs appeared to be plausible, the Agency still wished to take environmental samples from the remaining trailer said to have contained one of the WBCs.

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[8] Between 1989 and 1993, Iran irradiated two bismuth targets, and attempted to extract polonium from one of them, at TRR as part of a feasibility study for the production of neutron sources. Iran continues to maintain that the purpose of the irradiation had been to produce pure Po-210 on a laboratory scale, noting that, if production and extraction of Po-210 were successful, it could be used in radioisotope thermoelectric batteries. The Agency does not have any concrete information that is contrary to the statements made by Iran, but still remains somewhat uncertain regarding the plausibility of the stated purpose of the experiments.

39. However, with regard to the razing of the Lavisan-Shian site, in August 2005, Iran provided further clarification and additional documentation in support of its statement that the site had been razed following the return of the site to the Municipality of Tehran in connection with a dispute between the Municipality and the Ministry of Defence. Iran explained further that the razing of the site had been carried out by the Municipality, and that it had begun in December 2003 and was completed within two or three months. The information provided by Iran appeared to be coherent and consistent with its explanation of the razing of the Lavisan-Shian area.

40. The Agency is still awaiting additional information and clarifications from Iran regarding, and interviews with the individuals involved in, efforts by the Physics Research Centre, which had been located at Lavisan-Shian, to acquire dual use materials and equipment that could be used in uranium enrichment or conversion activities.

41. The Agency has discussed with the Iranian authorities open source information relating to dual use equipment and materials which have applications in the conventional military area and in the civilian sphere as well as in the nuclear military area. As described by the DDG-SG in his 1 March 2005 statement to the Board, in January 2005, Iran agreed, as a transparency measure, to permit the Agency to visit a site located at Parchin in order to provide assurance regarding the absence of undeclared nuclear material and activities at that site. Out of the four areas identified by the Agency to be of potential interest, the Agency was permitted to select any one area. The Agency was requested to minimize the number of buildings to be visited in that area, and selected five buildings. The Agency was given free access to those buildings and their surroundings and was allowed to take environmental samples, the results of which did not indicate the presence of nuclear material, nor did the Agency see any relevant dual use equipment or materials in the locations visited. In the course of the visit, the Agency requested to visit another area of the Parchin site. The Agency has been pursuing this matter with Iran since then with a view to being able to access the locations of interest at Parchin.

C. Current overall assessment

42. The Director General provided in paragraphs 106–114 of GOV/2004/83 a detailed overall assessment of Iran's nuclear programme and the Agency's efforts to verify Iran's declarations with respect to that programme. As indicated in that report, Iran has made substantial efforts over the past two decades to master an independent nuclear fuel cycle, and, to that end, had conducted experiments to acquire the know-how for almost every aspect of the fuel cycle. Many aspects of Iran's fuel cycle activities and experiments, particularly in the areas of uranium enrichment, uranium conversion and plutonium research, had not been declared to the Agency in accordance with Iran's obligations under its Safeguards Agreement. Iran's policy of concealment continued until October 2003, and resulted in many breaches of its obligation to comply with that Agreement (summarized in paragraph 4 above).

43. Since October 2003, good progress has been made in Iran's correction of the breaches, and in the Agency's ability to confirm certain aspects of Iran's current declarations, which will be followed up as a routine safeguards implementation matter (particularly in connection with conversion activities, laser enrichment, fuel fabrication and the heavy water research reactor programme).

44. Two important issues were identified in the Director General's November 2004 report as relevant to the Agency's efforts to provide assurance that there are no undeclared enrichment activities in Iran, specifically: the origin of LEU and HEU particle contamination found at various locations in Iran; and the extent of Iran's efforts to import, manufacture and use centrifuges of both the P-1 and P-2 designs.

45. With respect to the first issue — contamination — as indicated above, based on the information currently available to the Agency, the results of the environmental sample analysis tend, on balance, to support Iran's statement about the foreign origin of most of the observed HEU contamination. It is still not possible at this time, however, to establish a definitive conclusion with respect to all of the contamination, particularly the LEU contamination. This underscores the importance of additional work on the scope and chronology of Iran's P-1 and P-2 centrifuge programmes, which could greatly contribute to the resolution of the remaining contamination issues.

46. With respect to the second issue — the P-1 and P-2 centrifuge programmes — although, as indicated above, some progress has been made since November 2004 in the verification of statements by Iran regarding the chronology of its centrifuge enrichment programme, the Agency has not yet been able to verify the correctness and completeness of Iran's statements concerning those programmes. While Iran has provided further clarifications, and access to additional documentation, concerning the 1987 and mid-1990s offers related to the P-1 design, the Agency's investigation of the supply network indicates that Iran should have additional supporting information that could be useful in this regard. Iran has agreed to endeavour to provide further supporting information and documentation. Iran has also been asked to provide additional details on the process that led to Iran's decision in 1985 to pursue gas centrifuge enrichment and on the steps leading to its acquisition of centrifuge enrichment technology in 1987.

47. No additional information or documentation has been provided with respect to Iran's statement that it did not pursue any work on the P-2 design between 1995 and 2002. As indicated above, Iran has been requested to provide more information, along with any supporting documentation, relevant to the P-2 programme, in particular with regard to the scope of the original offer related to the P-2 related design and Iran's acquisition of items in connection with that programme.

48. The Agency is still assessing other aspects of Iran's past nuclear programme, including: statements made by it about plutonium research, in particular with respect to the dates they were carried out; Iran's activities at Gchine; and Iran's activities involving polonium.

49. The Agency continues to follow up on information pertaining to Iran's nuclear programme and activities that could be relevant to that programme. In this regard, it should be noted that, absent some nexus to nuclear material, the Agency's legal authority to pursue the verification of possible nuclear weapons related activity is limited. The Agency has, however, continued to seek Iran's cooperation in following up on reports relating to equipment, materials and activities which have applications in the conventional military area and in the civilian sphere as well as in the nuclear military area. Iran has permitted the Agency, as a measure of transparency, to visit defence related sites at Kolahdouz, Lavisan and Parchin. While the Agency found no nuclear related activities at Kolahdouz, it is still assessing information (and awaiting some additional information) in relation to the Lavisan site. The Agency is also still waiting to be able to re-visit the Parchin site.

50. In view of the fact that the Agency is not yet in a position to clarify some important outstanding issues after two and a half years of intensive inspections and investigation, Iran's full transparency is indispensable and overdue. Given Iran's past concealment efforts over many years, such transparency measures should extend beyond the formal requirements of the Safeguards Agreement and Additional Protocol and include access to individuals, documentation related to procurement, dual use equipment, certain military owned workshops and research and development locations. Without such transparency measures, the Agency's ability to reconstruct, in particular, the chronology of enrichment research and development, which is essential for the Agency to verify the correctness and completeness of the statements made by Iran, will be restricted.

51. As indicated to the Board in November 2004, all the declared nuclear material in Iran has been accounted for, and therefore such material is not diverted to prohibited activities. The Agency is, however, still not in a position to conclude that there are no undeclared nuclear materials or activities in Iran. The process of drawing such a conclusion, after an Additional Protocol is in force, under normal circumstances, is a time consuming process. In view of the past undeclared nature of significant aspects of Iran's nuclear programme, and its past pattern of concealment, this conclusion can be expected to take longer than in normal circumstances.

52. The Secretariat will continue its investigation of all remaining outstanding issues relevant to Iran's nuclear programme, and the Director General will continue to report to the Board as appropriate.

D. Suspension

53. Pursuant to the Board's resolution on 29 November 2004 (GOV/2004/90), and previous resolutions, the Agency has continued its activities to verify and monitor all elements of Iran's voluntary suspension of all enrichment related and reprocessing activities.

54. Prior to 22 November 2004, the Agency had already established a baseline inventory of all UF_6, essential centrifuge components, key raw materials and equipment, and the assembled centrifuge rotors at declared workshops said by Iran to have been involved in the manufacturing of centrifuge components, and had applied containment and surveillance measures to these items.

55. The Agency has continued its monthly monitoring activities at the Pilot Fuel Enrichment Plant (PFEP) at Natanz, most recently from 30 to 31 August 2005, to ensure that the suspension of enrichment activities at PFEP is fully implemented. The surveillance records from the cascade hall have been reviewed to ensure that no additional centrifuge machines were installed. The seals on the equipment and nuclear material have been replaced and verified. The inventory of centrifuge components has been verified periodically, and the seals on the essential components replaced and verified. The cascade hall, and the 20 sets of centrifuge components stored at the feed and withdrawal station, continue to be under Agency surveillance, and all the previously declared UF_6 feed material at PFEP, as well as product and tails, remain under Agency containment and surveillance.

56. The Agency has also continued to monitor the suspension by conducting:

- DIV activities at the Fuel Enrichment Plant (FEP) at Natanz and at the Molybdenum, Iodine and Xenon Facility at TNRC;
- monitoring of the decommissioned status of the Lashkar Ab'ad atomic vapour laser isotope separation pilot plant through complementary access at Lashkar Ab'ad and to laser enrichment equipment stored at TNRC and the Nuclear Research Centre for Agriculture and Medicine at Karaj;
- inspections and DIV at JHL; and
- visits to several declared workshops, randomly selected by the Agency, where centrifuge components had been manufactured and/or stored, including the Kalaye Electric Company workshop.

57. On 9 May 2005, during a DIV at FEP, Agency inspectors observed some construction work being carried out in the underground cascade hall of Building A and in the ventilation building above the

cascade hall foreseen in the design information for FEP submitted by Iran. Iran has described this work as civil construction, not covered by its voluntary suspension undertaking. In subsequent DIVs, the Agency has noted that this construction work is continuing.

58. The Agency also continued its verification of Iran's voluntary suspension of conversion activities at UCF. As reported previously, in August 2004, Iran introduced about 37 tonnes of uranium ore concentrate (UOC or yellowcake) into the process area of UCF as feed material for facility testing. As of 22 November 2004, all of the UOC had been dissolved and converted into intermediate products, principally AUC and UF_4, and part of the intermediate UF_4 had been converted into UF_6. On 22 November 2004, the Agency installed seals and other tamper indicating devices to verify that no additional feed was introduced in the process and that there was no further production of UF_6. On 18 February 2005, Iran completed its conversion of the AUC into UF_4, and conducted clean-out operations. The Agency carried out a physical inventory verification at UCF between 21 and 25 April 2005, in the course of which the UOC, the UF_4, the UF_6 and the scrap and waste generated by the conversion process were verified by the Agency, and the UF_4 placed under Agency seal. The material unaccounted for (MUF) as a result of the conversion campaign was calculated to be less than 1% of the total quantity of material fed into the process, which is within an acceptable range for similar size conversion plants. The process lines and nuclear material remained under Agency seal until August 2005.

59. On 1 August 2005, Iran informed the Agency of its decision to resume uranium activities at UCF.[9] The Agency installed additional surveillance equipment at UCF between 8 and 10 August 2005. On 8 August 2005, Iran started to feed UOC into the first part of the process line and on 10 August removed the Agency seals from the remaining parts of the process line. The UF_6 remained under Agency seal.

60. As of 29 August 2005, approximately 4000 kg of uranium in the form of UOC had been fed into the process and approximately 600 kg of uranium in the form of AUC produced, from which approximately 110 kg of uranium in the form of AUC was fed into the next process line. As of 29 August, no UF_4 had been produced as a result of that processing. From the 21 tonnes of uranium in the form of UF_4 produced during the previous campaign, approximately 8500 kg of uranium in the form of UF_4 was fed into the UF_4 to UF_6 process line, approximately 6800 kg of uranium in the form of UF_6 was produced therefrom. In a letter dated 29 August 2005, Iran informed the Agency of its intention to start moving the remaining inventory of UOC to the new storage area, and that it would likely take two months.

61. The Director General will continue to report to the Board as appropriate.

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[9] INFCIRC/648

ANNEX 1

CHRONOLOGY OF PLUTONIUM SEPARATION EXPERIMENTS

The Agency's current understanding of the chronology of Iran's activities in connection with the plutonium research is as follows:

1987–1988	The separation process was simulated using imported unirradiated UO_2 (DU); dissolution and purification took place in the Shariaty Building at TNRC; pressed and sintered pellets were manufactured using imported UO_2 (DU) at FFL; the UO_2 pellets were further manipulated into aluminium and stainless steel capsules at FFL
1988–1993	The capsules (containing a total of 7 kg of UO_2 in the form of powder, pressed pellets and sintered pellets) were irradiated in TRR
1991–1993	Plutonium was separated from some of the irradiated UO_2 targets in the capsules (about 3 kg of the 7 kg of UO_2) and plutonium solutions produced; these activities were carried out at the Shariaty Building and, after the activities were transferred in October/November 1992, at the Chamaran Building at TNRC; the research and development related irradiation and separation of plutonium were terminated in 1993
1993–1994	The unprocessed irradiated UO_2 was initially stored in capsules in the spent fuel pond of TRR, and later transferred into four containers and buried behind the Chamaran Building
1995	In July, purification of the plutonium solution from the 1988–1993 period was carried out in the Chamaran Building; a planchet (disk) was prepared from the solution for analysis
1998	In August, additional purification of plutonium from the 1988–1993 period was carried out in the Chamaran Building; another planchet (disk) was prepared from the solution for analysis
2000	The glove boxes from the Chamaran Building were dismantled and sent to ENTC for storage; one glove box was moved to the Molybdenum Iodine Xenon Facility
2003	Due to construction work being carried out behind the Chamaran building, two containers holding the unprocessed irradiated UO_2 were dug up, moved and reburied

ANNEX 2

ABBREVIATIONS AND TERMS

AEOI	Atomic Energy Organization of Iran
AUC	ammonium uranyl carbonate
DIV	design information verification
DU	depleted uranium
ENTC	Esfahan Nuclear Technology Centre
FEP	Fuel Enrichment Plant, Natanz
FFL	Fuel Fabrication Laboratory, ENTC
HEU	high enriched uranium
HWPP	Heavy Water Production Plant, Arak
IR-40	Iran Nuclear Research Reactor, Arak
JHL	Jabr Ibn Hayan Multipurpose Laboratories, TNRC
LEU	low enriched uranium
PFEP	Pilot Fuel Enrichment Plant, Natanz
SAL	Safeguards Analytical Laboratory, Seibersdorf, Austria
TNRC	Tehran Nuclear Research Centre
TRR	Tehran Research Reactor, Tehran
UCF	Uranium Conversion Facility, ENTC
UF_4	uranium tetrafluoride
UF_6	uranium hexafluoride
UO_2	uranium dioxide
UO_3	uranium trioxide
U_3O_8	urano-uranic oxide
UOC	uranium ore concentrate
WBC	whole body counter

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Board of Governors

GOV/2005/62
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The provisional agenda
(GOV/2005/59)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Report by the Director General

With further reference to GOV/2005/61, issued on 8 August 2005, I wish to inform the Members of the Board that Iran has today removed the seals on the process lines and the UF_4 at the Uranium Conversion Facility (UCF). I should also note that the surveillance equipment at the UCF is fully functional and that the uranium ore concentrate referred to in GOV/2005/61 has been verified by the Agency.

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The provisional agenda
(GOV/2005/59)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Report by the Director General

With reference to paragraph 2 of the resolution of the Board of Governors of 29 November 2004 (GOV/2004/90), in which the Board asked that the Director General inform Board Members should the suspension by Iran of its enrichment related and reprocessing activities not be fully sustained, and with reference to INFCIRC/648, which was circulated on 1 August 2005, I wish to inform the Members of the Board that today, 8 August 2005, Iran started to feed uranium ore concentrate (UOC) into the first part of the process line at the Uranium Conversion Facility (UCF).

This activity was commenced following the installation today by the Agency of cameras covering the input stage of the UOC process line, but regrettably prior to completion of the in situ testing of the cameras, which normally takes 24 hours following installation. It should be noted that the sealed parts of the process line remain intact.

I will keep the members of the Board informed of any further developments.

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Record of the 1130th Meeting

Held at Headquarters, Vienna, on Thursday, 16 June 2005, at 3.20 p.m.

Extract (paras. 48-61)

48. Mr. GOLDSCHMIDT (Deputy Director General for Safeguards) recalled that, in November 2004, the Secretariat had issued (as document GOV/2004/83) a report on the implementation of the agreement between the Islamic Republic of Iran and the Agency for the application of safeguards in connection with the NPT and on the Agency's verification of Iran's voluntary suspension of enrichment related and reprocessing activities.

49. The Director General, in his introductory statement, had already addressed the issues of suspension, transparency and cooperation. He would therefore limit his comments to other issues and to related developments since his oral update at the Board's March 2005 meetings. In connection with the Agency's verification activities at Natanz, the Agency had noted that Iran was modifying one of the underground structures at that site for the safe storage of equipment, in connection with which it had already submitted updated design information.

50. On 21 May 2005, the Agency had received from another Member State a number of centrifuge components, environmental sampling on which could provide information about the origin of the LEU and HEU particle contamination found at various locations in Iran. The analysis of the swipe samples taken from those components would take approximately two months to complete.

51. The Agency had continued its investigation of the outstanding questions related to Iran's P-1 and P-2 centrifuge programmes. As indicated at the March 2005 Board meetings, the recent emphasis had been on: a 1987 offer of a centrifuge-related design, technology and sample components; technical discussions between Iran and the intermediaries between 1987 and 1993; a mid-1990s offer of P-1 centrifuge documentation and components; and shipping documents related to the delivery of those documents and components.

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* Previously issued in English, Chinese and Russian; Arabic, French and Spanish versions forthcoming.

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52. As regards the 1987 offer, the one-page handwritten document (without dates, names, signatures or addresses) shown to the Agency on 12 January 2005 in Tehran, said to reflect an offer made by a foreign intermediary, suggested that the offer included the delivery of: a disassembled sample machine; drawings, specifications and calculations for a "complete plant"; and materials for 2000 centrifuge machines. The offer had also included the provision of auxiliary vacuum and electric drive equipment and uranium reconversion and casting capabilities. Iran had stated that only some of the items had been delivered, and that all of those items had been declared to the Agency. The Agency had repeatedly, most recently in a letter dated 14 April 2005, asked to have access to and copies of the original documentation reflecting the 1987 offer. In its 2 May 2005 reply to that letter, and in an amplification provided on 8 June 2005, Iran had stated that "[the] one page document provided to the Agency is the only existing one". Iran had further stated that the intermediaries had offered the reconversion unit with casting equipment on their own initiative and that, as the AEOI had not requested it, it had not received it.

53. Among other issues, the Agency still needed to understand what contacts had taken place during the period 1987–1993 between Iran and the intermediaries and why similar design documents on P-1 centrifuges had been delivered again in connection with the new offer made around 1994. That was important for establishing the chronology and sequence of the events associated with the development of Iran's enrichment programme, in particular with a view to ensuring that there had been no other development or acquisition of enrichment design, technology or components by Iran. In its communication received on 8 June 2005, Iran had stated that, apart from the meetings and discussions about which Iran had already informed the Agency, no other discussions on centrifuge enrichment had taken place.

54. In a letter dated 17 January 2005 and a letter dated 6 April 2005, Iran had informed the Agency that no written documentation relevant to the offer made in 1994 initially to an Iranian company unrelated to the AEOI for the delivery of P-1 centrifuge documentation, and for components for 500 centrifuges, was available to the Agency.

55. As reported in November 2004 (in document GOV/2004/83), Iran had stated that no work had been carried out on the P-2 design (or any centrifuge design other than the P-1 design) prior to 2002. The reasons given by Iran for the apparent gap between 1994–95 (when the P-2 design was said to have been received) and 2002, and the evidence provided to date in support thereof, did not yet provide sufficient assurance that no related activities had been carried out during that period. The Agency was continuing to investigate the matter and had asked Iran to search further for supporting information and documentation.

56. The Agency had sought from Iran access to documentation which supported Iran's declarations concerning the number of shipments of enrichment related equipment received by Iran, and the specific contents of those shipments. That was essential for verifying the completeness of Iran's declarations concerning such equipment. Under cover of a letter transmitted to the Agency on 17 January 2005, Iran had provided copies of a number of shipping documents said to have been related to "2 consignments in 1994 and 1995", which dates deviated from information provided earlier by Iran, particularly in the case of the new bellows that had previously been said to have been supplied in 1997. In a letter dated 14 April 2005, the Agency had asked Iran for permission to review the original folder of the 1994 shipping documents and to be provided with supporting documents reflecting the content of the shipments made in the 1994 consignments. In its response, dated 2 May 2005, Iran had stated that the new bellows had been shipped in a consignment which had

taken place in 1995. Also, Iran had noted that a copy of shipping documents had been provided to the Agency in January 2005 and that those documents indicated "exact shipping dates as well as custom clearance dates." In its amplification provided on 8 June 2005, Iran had reiterated that "[the] only existing shipping documents are those already submitted to the Agency" and that "considering the nature of the items and the deal no detail specification of the items in the containers exist."

57. From those shipping documents, it appeared that the first deliveries of P-1 components had started in January 1994, i.e. before the first meeting (previously said to have taken place in October 1994) of the AEOI representative with the intermediary. In response to the Agency's 9 March 2005 request for additional information in that connection, Iran had replied in its letter of 6 April 2005 that, having checked the service passport of the AEOI representative, "it is clear that he had made two trips relating to the matter in August and December 1993". Since that was not consistent with earlier information provided by Iran, the Agency had asked to see the original supporting documentation of the two Iranian representatives who had participated in the meetings with the intermediaries. No positive reply had been received thus far.

58. While there were no indications of undeclared mining or milling activities at Gchine, the Agency had, in order to understand better the complex arrangements governing the current and past administration of the mine, requested that the original contract between the AEOI and the engineering company that had constructed the mill at Gchine be made available for Agency review, along with related documentation. The Agency was further investigating why the AEOI had suspended the work on the very promising Gchine project from 1994 to 2000 in order to focus on a much less promising ore deposit at Saghand.

59. Following Iran's conversion of approximately 37 tons of uranium ore concentrate at the Uranium Conversion Facility, and the subsequent clean-out of the process lines, the Agency had carried out a physical inventory verification of the nuclear material (in the form of UF_4, UF_6, scrap and waste) at the Uranium Conversion Facility between 21 and 25 April 2005. From a preliminary assessment, the quantities of material appeared to correspond to those declared by Iran. Until the analysis of the nuclear material samples taken during the physical inventory verification was completed, however, it was not possible to finalize those figures.

60. As indicated in previous reports to the Board, the Agency had been trying to establish the dates of Iran's plutonium separation experiments. Iran had said that the experiments had been completed in 1993 and that no plutonium had been separated since then. The matter had been discussed further with Iran in April 2005. At the request of the Agency, the plutonium discs which had been prepared from the solutions by the facility operator for alpha spectroscopy, and which had been placed under Agency seal in October 2003, had been shipped to Vienna for further analysis. On 20 May 2005, the Agency had written to Iran seeking confirmation of statements made by Iran at the April 2005 meeting to the effect that the solution in one bottle had been processed in 1995 whereas the solution in the second one had been purified in 1998. In a letter dated 26 May 2005, Iran had confirmed the Agency's understanding with regard to that chronology. Those clarifications would be assessed together with the plutonium disc analysis results when they became available.

61. In March 2005, Agency inspectors had, for design information verification purposes, visited the Arak site and had noted that construction of the heavy water research reactor (IR-40) building had started. The visit had included complementary access to the Heavy Water Production Plant, which was currently being commissioned.

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Record of the 1119th Meeting

Held at Headquarters, Vienna, on Tuesday, 1 March 2005, at 3.05 p.m.

Extract (paras. 101-121)

101. Mr. GOLDSCHMIDT (Deputy Director General for Safeguards), introducing the sub-item, said that he had nothing to add about safeguards implementation in Egypt to the report contained in document GOV/2005/9 and that he would inform the Board about the progress made in the Agency's verification activities in the Islamic Republic of Iran and about the issue of Small Quantities Protocols.

102. In November 2001, the Secretariat had provided (in document GOV/2004/83) a comprehensive report on the Agency's verification of compliance by Iran with its NPT safeguards agreement and its voluntary suspension of enrichment-related and reprocessing activities.

103. Since the November 2004 meetings of the Board, Iran had facilitated in a timely manner Agency access to nuclear material under its safeguards agreement and additional protocol, and the Agency had carried out inspections at facilities in Tehran, Natanz and Esfahan and had had complementary access to three locations outside facilities.

104. As regards the centrifuge programme, the Agency was expecting some progress on the contamination issue. It had agreed with the Member State concerned on the modalities for sampling a number of old centrifuge components, which could provide information about the origin of the low-enriched and high-enriched uranium particle contamination found at various locations in Iran. In January 2005, an Agency team had again visited locations in another Member State where, according to Iran, the centrifuge components had been stored prior to their shipment to Iran. Environmental samples had been collected from those locations and would be analysed.

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* Previously issued in English, Chinese and Russian. Arabic, French and Spanish version forthcoming.

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105. Although there had been no new information about the outstanding questions related to Iran's P-2 centrifuge programme, there had been developments in four other areas related to the Agency's verification of the P-1 centrifuge programme, in connection with: an early offer of centrifuge-related technology and sample components; the genesis of the mid-1990s offer of P-1 centrifuge documentation and components for 500 centrifuges; shipping documents related to the delivery of those components and documentation; and technical discussions held between Iran and the intermediaries concerning centrifuge enrichment. He would briefly describe each of those developments.

106. During a meeting on 12 January 2005 in Tehran, Iran had shown the Agency a handwritten one-page document reflecting an offer said to have been made to Iran in 1987 by a foreign intermediary. While it was not clear from the document precisely what the offer entailed, Iran had stated that it related to centrifuge technology acquisition. The document suggested that the offer included the delivery of: a disassembled sample machine (including drawings, descriptions, and specifications for production); drawings, specifications and calculations for a "complete plant"; and materials for 2000 centrifuge machines. The document also reflected an offer to provide auxiliary vacuum and electric drive equipment and uranium re-conversion and casting capabilities. Iran had stated that only some of those items had been delivered, and that all of those items had been declared to the Agency. That information was still being assessed. The Agency had requested that all documentation relevant to the offer be made available to it for review.

107. In response to questions about the procurement history associated with shipments in the mid-1990s of P-1 centrifuge components and documentation, Iran had informed the Agency in October 2004 that, around 1994, the Atomic Energy Organization of Iran (AEOI) had been informed that an intermediary had made an offer to an Iranian company unrelated to the AEOI to deliver P-1 centrifuge documentation and components for 500 centrifuges. Responding to Agency enquiries in that context, in a letter dated 9 January 2005 Iran had stated that, following the AEOI's being informed about the offer, "instruction [had been] given by high authority that no other entity or organisation other than AEOI was allowed to conduct centrifuge enrichment projects and enter into negotiations." As a response to an Agency request, Iran had said that no written documentation relevant to the initial offer to the Iranian company was available.

108. As regards the deliveries in the mid-1990s of the 500 sets of P-1 components and additional bellows, the Agency had on a number of occasions requested copies of all relevant shipping documents. Under cover of a letter transmitted to the Agency on 17 January 2005, Iran had provided copies of some shipping documents said to have been related to "2 consignments in 1994 and 1995", which were now being assessed, particularly with respect to the dates and contents of the shipments. The Agency had requested that Iran search for any additional information related to the procurement of centrifuge components and technology, particularly information related to shipments that took place around 1997.

109. In response to the Agency's request for documentation related to Iran's technical discussions with intermediaries concerning centrifuge enrichment in the mid- to late-1990s, Iran had during the 12 January meeting in Tehran also provided the Agency with copies of a number of documents, which were now being assessed.

110. Turning to other matters, he said, regarding plutonium separation, that, as mentioned in the latest report to the Board, the Agency had, in September 2004, taken a second set of samples from the plutonium solution for analysis using different analytical techniques in different laboratories, with a view to confirming the date of the separation. The measurement results had been received by the Agency and were being assessed.

111. The Agency had continued implementing the measures of the additional protocol. Complementary access at the Uranium Conversion Facility (UCF) site on 15 December 2004 had revealed underground excavation activities which Iran had failed to report in a timely manner to the Agency as required under Code 3.1 of the subsidiary arrangements to its safeguards agreement (namely, at the time the decision was taken to authorize or carry out such construction). Through a letter received by the Agency on 13 December 2004, Iran had submitted an updated Design Information Questionnaire (DIQ) for the UCF providing preliminary design information for a tunnel that was being constructed at the UCF site. In the DIQ entry related to the purpose and nature of the tunnel, Iran had stated that "in order to increase capacity, safety and security of nuclear material, a storage is considered and will be constructed." Iran had also stated that the modifications had been initiated in September 2004.

112. On 8 February 2005, the Agency had conducted complementary access at the Gchine mine — in the south of Iran near Bandar Abbas — and its associated mill. To better understand the complex arrangements governing the current and past administration of the mine, the Agency had requested that the original contract between the AEOI and the engineering company that had constructed the mill at Gchine be made available to it for review, along with related documentation.

113. In its resolution adopted on 18 September 2004 (GOV/2004/79), the Board of Governors had called on Iran ", as a further confidence-building measure, voluntarily to reconsider its decision to start construction of a research reactor moderated by heavy water". No visit to the site of that reactor had taken place since the Board had adopted that resolution. Iranian officials had indicated that the Heavy Water Research Reactor (IR-40) project was progressing.

114. Concerning transparency visits, he said that, as stated in the Director General's November 2004 report, in accordance with its practice in connection with its evaluation of other States' nuclear programmes, the Agency had discussed with Iranian authorities open-source information relating to dual-use equipment and materials which had applications in the conventional military area and in the civilian sphere as well as in the nuclear military area.

115. In that context, the Agency was continuing to assess information related to the Lavisan site. As reported at the November 2004 Board meetings, Iran had provided information to the Agency in October 2004 in response to Agency inquiries about efforts by the Physics Research Centre (PHRC), located at the Lavisan-Shian site between 1989 and 1998, to acquire dual-use material and equipment that could be useful in uranium enrichment and conversion activities. The Agency had requested that the matter be discussed in detail with two officials who had been involved in the procurement activities of the PHRC. In response to the Agency's request for additional information and clarification from Iran in connection with the matter, in a Note Verbale dated 27 February 2005 Iran had stated:

> "1. The PHRC of Lavisan was not involved in activities declarable under the NPT Safeguards.
>
> "2. The dual use items such as those in question could be used in conventional activities, which Iran is not obliged to declare under the Comprehensive Safeguards and the Additional Protocol."

116. With regard to Parchin, as stated in the Director General's latest report, in October 2004 the Agency had reiterated its request to be permitted to visit the Parchin site. In response to security concerns expressed by Iran about a visit, the Agency had, in a note dated 25 October 2004, proposed modalities under which the visit could take place. At a meeting in Vienna on 7 January 2005, Iran had, in the interests of transparency, agreed to permit the Agency to visit Parchin. The Agency had been permitted to select one of the four areas which it had identified as being of potential interest. It had been requested to minimize the number of buildings to be visited in that area and had selected five. The Agency had been given free access to those buildings and their surroundings, and permission to take environmental samples, which were currently being analysed. In the course of that visit, the Agency had also reiterated its request to be permitted to visit another area of particular interest on the Parchin site before the end of February. In a Note Verbale dated 27 February 2005, Iran had stated that "the expectation of the Safeguards Department in visiting specified zone and points in the Parchin Complex are fulfilled and thus that there was no justification for any additional visit."

117. As a result of its limited-scope visit to Parchin, the Agency was able to inform the Board that it had seen no relevant dual-use equipment or materials in the location visited. The Agency was awaiting the results of environmental sampling analysis to ascertain whether any nuclear material had been used in the area visited.

118. With regard to the suspension of activities, he said that, pursuant to the Board's resolution of 29 November 2004 (GOV/2004/90) and to previous resolutions, the Agency had continued its activities for verifying all elements of Iran's voluntary suspension of all enrichment-related and reprocessing activities.

119. Prior to 22 November 2004, the Agency had already established a baseline inventory of all UF_6, essential centrifuge components, key raw materials and equipment, and the assembled centrifuge rotors at declared workshops said by Iran to have been involved in the manufacturing of centrifuge components, and it had applied containment and surveillance measures to those items. The Agency had continued to monitor the suspension at the Natanz site, including the Pilot Fuel Enrichment Plant (PFEP) and the Fuel Enrichment Plant. A number of solenoid valves that had been removed from the PFEP prior to 22 November 2004 had been cleaned of corrosive products and stored by Iran at the facility, and they were being monitored by the Agency. The 20 sets of centrifuge components that Iran had initially intended to use for research and development purposes remained under surveillance at the PFEP. The Agency had also monitored centrifuge component production capabilities at the declared workshops selected randomly during Agency visits to Iran.

120. During visits to Farayand Technique in December 2004 and January 2005, the Agency had noted that quality control activities were being carried out with regard to some centrifuge components (for example, stator bellows, springs and casing supports) which had been declared to the Agency but not placed under Agency seals. In response to the Agency's request for clarification concerning those activities, Iran had informed the Agency, by letter of 13 February 2005, that, although those activities were not considered by Iran to be covered by the voluntary suspension of centrifuge enrichment-related activities, Iran had decided to put them temporarily on hold until the matter could be discussed with, among others, the EU3.

121. The Agency had also continued its verification of Iran's voluntary suspension of conversion activities at the UCF. As previously reported, in August 2004 Iran had introduced approximately 37 tons of uranium ore concentrate (UOC) into the process area of the UCF as feed material for facility testing. As of 22 November 2004, all of the UOC had been dissolved and converted into intermediate products, principally ammonium uranyl carbonate (AUC) and UF_4, and part of the intermediate UF_4 had been converted into UF_6. On 22 November 2004, the Agency had installed seals and other tamper-indicating devices to verify that no additional feed was introduced and that there was

no further production of UF_6. Iran had continued to convert the AUC into UF_4, which had taken longer than initially planned. It had completed the conversion work on 18 February 2005, and it was now planning to conduct clean-out operations that would take several weeks. The produced UF_4 had been verified by the Agency and was now under Agency seal. The produced UF_6, which had been transferred from the process into cylinders, had been verified and sealed and placed under Agency surveillance. To ensure that there was no undeclared withdrawal of the UF_6 remaining in the UCF process lines, the Agency had sealed the UF_6 withdrawal stations and installed cameras there. Physical inventory verification at the UCF was scheduled to take place in April 2005, after the clean-out operations had been completed.

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Item 4(d) of the provisional agenda
(GOV/2004/82)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Report by the Director General

1. At its meeting in September 2004, the Board of Governors considered the latest report submitted by the Director General on the implementation of the Agreement between the Islamic Republic of Iran (hereinafter referred to as Iran) and the Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (the Safeguards Agreement[1]).[2]

2. On 18 September 2004, the Board of Governors adopted resolution GOV/2004/79, in which, inter alia, it:

- Strongly urged that Iran respond positively to the Director General's findings on the provision of access and information by taking such steps as are required by the Agency and/or requested by the Board in relation to the implementation of Iran's Safeguards Agreement, including the provision of prompt access to locations and personnel, and by providing further information and explanations when required by the Agency and proactively to assist the Agency to understand the full extent and nature of Iran's enrichment programme and to take all steps within its power to clarify the outstanding issues before the Board's 25 November 2004 meeting, specifically including the sources and reasons for enriched uranium contamination and the import, manufacture and use of centrifuges;
- Emphasized the continuing importance of Iran acting in accordance with all provisions of the Additional Protocol, including by providing all access required in a timely manner; and urged Iran once again to ratify its Protocol without delay;
- Deeply regretted that the implementation of Iranian voluntary decisions to suspend enrichment-related and reprocessing activities, notified to the Agency on 29 December 2003 and 24 February 2004, fell significantly short of the Agency's understanding of the scope of those commitments and also that Iran had since reversed some of those decisions; stressed that such suspension would provide the Board with additional confidence in Iran's future activities; and

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[1] INFCIRC/214.

[2] The initial report to the Board of Governors on this specific matter was provided by the Director General orally at the Board's meeting on 17 March 2003. The Director General subsequently submitted six written reports to the Board: GOV/2003/40, dated 6 June 2003; GOV/2003/63, dated 26 August 2003; GOV/2003/75, dated 10 November 2003; GOV/2004/11, dated 24 February 2004; GOV/2004/34, dated 1 June 2004, and Corr.1, dated 18 June 2004; and GOV/2004/60, dated 1 September 2004.

considered it necessary, to promote confidence, that Iran immediately suspend all enrichment related activities, including the manufacture or import of centrifuge components, the assembly and testing of centrifuges and the production of feed material, including through tests or production at the Uranium Conversion Facility (UCF), under Agency verification so that this could be confirmed in the reports requested by the Board in paragraphs 7 and 8 of resolution GOV/2004/79;

- Called again on Iran, as a further confidence-building measure, voluntarily to reconsider its decision to start construction of a research reactor moderated by heavy water;
- Underlined the need for the full and prompt cooperation with the Agency of third countries in relation to the clarification of outstanding issues, and expressed appreciation for the cooperation received by the Agency to date;
- Requested the Director General to submit in advance of the November Board: a report on the implementation of this resolution; and a recapitulation of the Agency's findings on the Iranian nuclear programme since September 2002, as well as a full account of past and present Iranian cooperation with the Agency, including the timing of declarations, and a record of the development of all aspects of the programme, as well as a detailed analysis of the implications of those findings in relation to Iran's implementation of its Safeguards Agreement; and
- Requested the Director General to submit in advance of the November Board a report on Iran's response to the requests made of it by the Board in previous resolutions, especially requests relating to full suspension of all enrichment related and reprocessing activities.

3. The present report is submitted to the Board in response to these requests. Section I addresses questions relevant to safeguards implementation in Iran, including the development of Iran's nuclear programme, Agency findings, implications, Iran's cooperation and an overall assessment; Section II addresses questions relevant to the suspension by Iran of enrichment related and reprocessing activities. The report also includes a list of locations relevant to the implementation of safeguards in Annex 1 and, in Annex 2, a list of abbreviations and terms used in this report.

I. SAFEGUARDS IMPLEMENTATION[3]

A. Development, Findings and Implications

A.1. Development and Findings

A.1.1. Uranium Mining and Ore Concentration

Development

4. Iran has a long-standing programme of exploration for uranium deposits, and has selected two locations for development as mines. At the Saghand Mine, located in Yazd in central Iran, low grade hard rock ore bodies will be exploited through conventional underground mining techniques. The annual estimated production design capacity is forecast as 50 t of uranium. The infrastructure and shaft sinking are essentially complete, and tunnelling towards the ore bodies has started. Ore production is

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[3] Since the meeting of the Board of Governors in September 2004, the Agency has continued its verification activities in Iran, including inspections, complementary access and design information verification. In addition, an Agency team, headed by the Deputy Director General for Safeguards and the Director of Safeguards Operations Division B, met in Tehran with Iranian authorities between 12 and 16 October 2004 to discuss outstanding issues.

forecast to start by the end of 2006. The ore is to be processed into uranium ore concentrate (UOC/yellowcake) at the associated mill at Ardakan, the Yellowcake Production Plant. The design capacity of the mill corresponds to that of the mine (50 t of uranium per year). The mill startup is forecast to coincide with the start of mining at Saghand. The mill site is currently at an early stage of development; the installation of the infrastructure and processing buildings has been started. In the south of Iran, near Bandar Abbas, Iran has constructed the Gchine uranium mine and its co-located mill. The low but variable grade uranium ore found in near-surface deposits will be open-pit mined and processed at the associated mill. The estimated production design capacity is 21 t of uranium per year. Iran has stated that, as of July 2004, mining operations had started and the mill had been hot tested, during which testing a quantity of about 40 to 50 kg of yellowcake was produced.

5. Iran has explored two other potential uranium production routes. One was the extraction of uranium from phosphoric acid. Using research scale equipment, small quantities of yellowcake were successfully produced at the Tehran Nuclear Research Centre (TNRC) laboratories. Iran has stated that there are no facilities in Iran for separating uranium from phosphoric acid other than the research facilities at TNRC. The second route explored by Iran was the production of yellowcake using percolation leaching. Using this technique, Iran produced an estimated several hundred kilograms of yellowcake using temporary facilities, now dismantled, located at the Gchine mining site.

Findings

6. In its Additional Protocol declarations of 21 May 2004, Iran provided information to the Agency on the location, operational status and estimated annual production capacity of the Gchine mine and mill, the Saghand Mine and the Yellowcake Production Plant. The Agency carried out complementary access at Gchine on 17 July 2004, at the Saghand Mine on 6 October 2004 and at the Ardakan Yellowcake Production Plant on 7 October 2004, in the course of which the Agency was able to confirm the declared status of these operations.

7. Access to these sites, and clarifications requested by the Agency, have been provided by Iran in a timely manner. The Agency's assessment of the information related to these mines and mills as declared by Iran under the Additional Protocol is ongoing, as is the analysis of samples taken from those locations.

A.1.2. Uranium Conversion

Development

8. Iran carried out most of its experiments in uranium conversion between 1981 and 1993 at TNRC and at the Esfahan Nuclear Technology Centre (ENTC), with some experiments (e.g. those involving pulse columns) being carried out through early 2002.

9. In 1991, Iran entered into discussions with a foreign supplier for the construction at Esfahan of an industrial scale conversion facility. Construction on the facility, UCF, was begun in the late 1990s. UCF consists of several conversion lines, principal among which is the line for the conversion of UOC to UF_6 with an annual design production capacity of 200 t uranium as UF_6. The UF_6 is to be sent to the uranium enrichment facilities at Natanz, where it will be enriched up to 5% U-235 and the product and tails returned to UCF for conversion into low enriched UO_2 and depleted uranium metal. The design information for UCF provided by Iran indicates that conversion lines are also foreseen for the production of natural and enriched (19.7%) uranium metal, and natural UO_2. The natural and enriched (5% U-235) UO_2 are to be sent to the Fuel Manufacturing Plant (FMP) at Esfahan, where Iran has said it will be processed into fuel for a research reactor and power reactors.

10. In March 2004, Iran began testing the process lines involving the conversion of UOC into UO_2 and UF_4, and UF_4 into UF_6. As of June 2004, 40 to 45 kg of UF_6 had been produced therefrom. A larger test, involving the conversion of 37 t of yellowcake into UF_4, was initiated in August 2004. According to Iran's declaration of 14 October 2004, 22.5 t of the 37 t of yellowcake had been fed into the process and that approximately 2 t of UF_4, and 17.5 t of uranium as intermediate products and waste, had been produced. There was no indication as of that date of UF_6 having been produced during this later campaign.

Findings

11. Iran has stated that UCF was to have been constructed under a turn-key contract with a foreign supplier, but that when the contract was cancelled in 1997, Iran retained the engineering designs and used them as the basis to construct UCF with Iranian resources. Iran provided preliminary design information to the Agency in July 2000. The Agency has been carrying out continuous design information verification (DIV) since that time.

12. The Agency's enquiry into the chronology and scope of Iran's uranium conversion activities has focused on two central issues:

- Assessment of Iran's statements concerning the basis for its design of UCF (including conversion experiments), with a view to ascertaining whether Iran has declared all of its activities involving nuclear material; and
- Assessment of the declared intended uses for the products of the various UCF process lines.

Design Basis and Conversion Experiments

13. In February 2003, Iran acknowledged that it had imported in 1991 natural uranium, in a variety of forms, which it had not previously reported to the Agency[4], and that it had used some of these materials, at locations which had not previously been reported to the Agency, for testing certain parts of the UCF conversion process (i.e. uranium dissolution, purification using pulse columns and the production of uranium metal). On a number of occasions between February and July 2003, Iran stated that this information, along with documentation provided by the foreign supplier, had been sufficient to permit Iran to complete indigenously the detailed design and manufacturing of the equipment for UCF. Iran repeatedly stated that it had not carried out any research and development (R&D) or testing, even on a laboratory scale, of other more complex processes (e.g. conversion of UO_2 to UF_4 and conversion of UF_4 to UF_6) using nuclear material.

14. Following the discovery by the Agency of indications of depleted UF_4 in samples of waste taken at the Jabr Ibn Hayan Multipurpose Laboratories (JHL) at TNRC, Iran acknowledged, in a letter dated 19 August 2003, that it had carried out UF_4 conversion experiments on a laboratory scale during the 1990s at the Radiochemistry Laboratories of TNRC using depleted uranium which had been imported in 1977 and exempted from safeguards upon receipt, and which Iran had declared in 1998 (when the material was de-exempted) as having been lost during processing. In October 2003, Iran further acknowledged that, contrary to its previous statements, practically all of the materials important to uranium conversion had been produced in laboratory and bench scale experiments (in kilogram quantities) carried out at TNRC and at ENTC between 1981 and 1993 without having been reported to the Agency. The information provided in Iran's letter of 21 October 2003 stated that, in conducting these experiments, Iran had also used yellowcake imported by Iran in 1982 but only confirmed in 1990

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[4] In the form of UF_6 (1000 kg), UF_4 (400 kg) and UO_2 (400 kg)

as having been received.[5] Iran subsequently explained that it had decided to stop domestic R&D on UF_4 and UF_6 in 1993 in anticipation of its receipt of assistance from a foreign supplier in the design and construction of UCF.

15. The extensive UCF design documentation said to have been provided by the foreign supplier was made available to the Agency. Based on an examination of a selection of that documentation, and taking into account the declarations by Iran concerning its UCF related conversion experiments, Agency conversion experts concluded that Iran's declaration that UCF was being built essentially on the basis of this documentation, augmented by the results of the indigenous experiments, appeared to be credible.

16. The Agency has also sought to confirm the declarations of Iran concerning the quantities of nuclear material involved in Iran's conversion experiments. Given the inherent difficulties with investigating activities that ended over a decade ago, it is not possible to verify in detail the chronologies and descriptions of the experiments which took place in Iran. Thus, the Agency's activities have had to focus on assessing the consistency of the information provided by Iran and examining the remaining equipment and nuclear material.

17. In this context, the Agency focused its investigation on the small quantities of nuclear material said to have been used and produced during these experiments in light of the size, quality and capacity of the equipment involved, and the status and use of the equipment during the period between when the activities were said to have ceased (between 1991 and 1993) and April 1999, when most of the equipment was said to have been dismantled and put into storage until January 2004[6]. Taking into account the age of the activities and the lack of records with regard to the amount of uranium (especially that said to be contained in waste), a precise nuclear material accounting is not possible. However, examination of the equipment prior to and during its destruction revealed the equipment to be in very good condition and apparently to have been little used, which is consistent with the declared scale of its use.

18. As indicated in the Director General's last report to the Board (GOV/2004/60), further follow-up on Iran's conversion activities will be carried out as a routine safeguards implementation matter.

Intended uses of UCF products

19. In the design information for UCF provided in July 2000, the facility was described as being intended for the conversion of UOC into UF_6, for enrichment outside Iran, and for the subsequent conversion (at UCF) of: low enriched UF_6 into low enriched UO_2 (5% U-235); low enriched UF_6 into low enriched uranium metal (19.7% U-235); and depleted UF_6 into depleted UF_4. In the course of a DIV in 2002, the Agency noticed that the depleted UF_4 process line had been extended to include a process line for uranium metal production, and requested Iran to submit updated design information, which it did in April 2003. Following its declaration in February 2003 of the Pilot Fuel Enrichment Plant (PFEP) and the Fuel Enrichment Plant (FEP) at Natanz, Iran also acknowledged that it intended to carry out enrichment of UF_6 domestically, up to 5% U-235, as per the declared maximum enrichment level for PFEP and FEP. Iran has not provided specific information on the intended source of the 19.7% enriched UF_6 which will serve as feed for the production at UCF of 19.7% enriched uranium metal, as declared by Iran, but did indicate in 2000 that it would be secured from abroad.

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[5] In addition, it should be noted that, in 1982, Iran imported 531 t of natural U_3O_8 concentrate, which it reported to the Agency in 1990.

[6] In January 2004, the equipment was examined by the Agency and the nuclear material hold-up recovered therefrom. At the initiative of the Iranian authorities, the equipment was destroyed in the course of these recovery activities.

20. Before the revelation by Iran in October 2003 of its laser enrichment programme, various explanations were given for the intended use of uranium metal. In July 2003, Iranian officials explained, that, "[i]n the early [1990's] when the country decided to reconsider its nuclear program, we were not sure whether it will consist of CANDUs, Magnox [reactors], or LWRs. Therefore, it was decided to include a U-metal production line in UCF, which could also be used to produce shielding material. However, as the picture is now more clear, uranium metal experiments could be considered as a process to gain know-how in nuclear material production."[7] The rationale given for the production of depleted uranium metal was to reduce the storage requirements for depleted UF_6.

21. In its letter of 21 October 2003, Iran acknowledged that the uranium metal had been intended not only for the production of shielding material, as previously stated, but also for use in its laser enrichment programme (the existence of which, as discussed below, Iran had previously not acknowledged, and which was only declared to the Agency in that same letter of 21 October 2003). Iran stated that the uranium metal process line at UCF had been developed by Iranian scientists at the TNRC laboratories, and that a small quantity of the metal produced at TNRC during the development tests (about 2 kg) had been given to the laser group for its evaluation.

22. In light of this, the declared rationale for the original construction of the natural uranium metal process line at UCF (i.e. the supply of uranium metal to its laser enrichment programme) is credible.

A.1.3. Uranium Enrichment – Gas Centrifuge Technology

Development

23. In 1985, Iran initiated its efforts in gas centrifuge enrichment with a search of available technical literature. In 1987, Iran acquired through a clandestine supply network drawings for a P-1 centrifuge, along with samples of centrifuge components. According to Iran, gas centrifuge R&D testing began at TNRC in 1988 and continued there until 1995, when those activities were moved to a workshop of the Kalaye Electric Company, a company in Tehran belonging to the Atomic Energy Organization of Iran (AEOI). Between 1994 and 1996, Iran received another — apparently duplicate — set of drawings for the P-1 centrifuge design, along with components for 500 centrifuges. According to Iran, it was at this time as well when Iran received design drawings for a P-2 centrifuge through the same network. Between 1997 and 2002, Iran assembled and tested P-1 centrifuges at the Kalaye Electric Company workshop where Iran says it fed UF_6 gas into a centrifuge for the first time in 1999 and, in 2002, fed nuclear material into a number of centrifuges (up to 19 machines).

24. In 2001, Iran began the construction of two facilities at Natanz: the smaller scale PFEP, planned to have some 1000 centrifuges for enrichment up to 5% U-235; and the large scale commercial FEP, which is planned to contain over 50 000 P-1 centrifuges for enrichment up to 5% U-235.

25. On 25 June 2003, Iran introduced UF_6 into the first centrifuge at PFEP. As of October 2003, the installation of a 164-machine cascade was being finalized. In November 2003, the cascade was shut down. As of the Agency's latest inspection on 11 October 2004, the cascade had not been operated and no further UF_6 gas had been fed into centrifuges at PFEP. FEP has been scheduled to start receiving centrifuges in early 2005, after the design is confirmed by the tests to be conducted in PFEP.

26. According to Iran, the only work that has been done on the P-2 design was carried out between 2002 and 2003, largely at the workshop of a private company under contract with the AEOI, and the work was limited to the manufacture and mechanical testing of a small number of modified P-2

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[7] Candu reactors use natural uranium oxide fuel, Magnox reactors use natural uranium metal fuel, and light water reactors (LWRs) use enriched uranium oxide (generally less than 5% U-235).

composite rotors. Iran has stated that "no other institution (including universities), company or organization in Iran has been involved in P-2 R&D" and that "no P-2 R&D has been undertaken by or at the request of the Ministry of Defence". Iran has also said that all R&D on P-2 centrifuges had been terminated and that no other work on that, or any other centrifuge design, was done prior to 2002 or has been done since 2003. However, in its Additional Protocol declarations, Iran has foreseen P-2 R&D activities for the future.

Findings

27. Between February and October 2003, Iran took a number of steps intended to conceal the origin, source and extent of Iran's enrichment programme, including: denying access to the Kalaye Electric Company workshop in February 2003 and refusing to permit the Agency to take environmental samples there in March 2003; dismantling equipment used at the workshop and moving it to Pars Trash (another subsidiary company of the AEOI located in Tehran); renovating part of the Kalaye Electric Company workshop in order to prevent detection of the use of nuclear material; and submitting incorrect and incomplete declarations. A detailed description of these efforts is reflected in the previous reports of the Director General to the Board.[8]

28. Following adoption by the Board of its resolution in September 2003,[9] on 16 October 2003, H.E. Dr. H. Rohani, Secretary of the Supreme National Security Council of Iran, informed the Director General that a decision had been taken to provide the Agency with a full disclosure of Iran's past and present nuclear activities. On 21 October 2003, Iran submitted to the Agency a letter providing what it described as a full picture of its nuclear activities, in which it acknowledged, inter alia, its use of nuclear material in the testing of centrifuges.

P-1 Centrifuge Programme

29. In February 2003, in response to Agency enquiries since August 2002 prompted by open source reports, Iran acknowledged for the first time the existence of the two centrifuge enrichment plants under construction at Natanz: PFEP and FEP. Iran also acknowledged that the Kalaye Electric Company workshop in Tehran had been used for the production of centrifuge components, but stated that there had been no testing of centrifuges assembled from these components involving the use of nuclear material, either at that workshop or at any other location in Iran.

30. According to information provided at that time by Iran, the design, research and development work, which it said had been started only five years earlier (i.e. 1997), had been based on information available from open sources and extensive computer modelling and simulation, including tests of centrifuge rotors without nuclear material. In June 2003, Iran reiterated that its centrifuge R&D had commenced only in 1997, with centrifuge testing having taken place in the Plasma Physics buildings of TNRC. The Agency was shown the areas within the buildings where the testing was said to be been conducted, and was again told that no nuclear material had been used during the test programme. Based on their own observations and their discussions with Iranian authorities, the Agency enrichment technology experts concluded that it was not possible for Iran to have developed enrichment

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[8] GOV/2003/40, paras 25–29; GOV/2003/63, paras 27–43; GOV/2003/75, paras 30–41, Annex 1 paras 34–65; GOV/2004/11, paras 32–55; GOV/2004/34, paras 22–30, Annex paras 21–45; and GOV/2004/60, paras 22–32, Annex paras 17–39.

[9] In resolution GOV/2003/69, the Board of Governors decided it was essential and urgent for Iran to take a number of measures by the end of October 2003, including "providing a full declaration of all imported material and components relevant to the enrichment programme, especially imported equipment and components stated to have been contaminated with high enriched uranium particles, and collaborating with the Agency in identifying the source and date of receipt of such imports and the locations where they have been stored and used in Iran."

technology to the level seen at Natanz based solely on open source information, computer simulation and mechanical testing.

31. In August 2003, Iran amended these statements, informing the Agency that the decision to launch a centrifuge enrichment programme had actually been taken in 1985, and that Iran had in fact received drawings of the P-1 centrifuge through a foreign intermediary around 1987. Iran stated that the centrifuge R&D programme had been situated at TNRC between 1988 and 1995, and had been moved to the Kalaye Electric Company workshop in 1995. According to Iran, the centrifuge R&D activities were carried out at the Kalaye Electric Company workshop between 1995 and 2003, and were moved to Natanz in 2003.

32. During its August 2003 visit to Iran, the Agency was shown electronic copies of the centrifuge engineering drawings (including the general arrangement, sub-assembly and component drawings). Agency inspectors were also able to visit and take environmental samples at the Kalaye Electric Company workshop, where they noted that, since their first visit to the workshop in March 2003, considerable renovation had been made to one of the buildings on the site. As was anticipated by the Agency at the time, the renovation, which was carried out in connection with Iran's attempt to conceal the activities carried out there, has interfered with the Agency's ability to resolve issues associated with Iran's centrifuge enrichment programme, since the Agency was unable to see the equipment in situ and could not take environmental samples while the equipment was there.

33. In its letter of 21 October 2003, Iran finally acknowledged that "a limited number of tests, using small amounts of UF_6," had been conducted in 1999 and 2002 at the Kalaye Electric Company workshop.[10]

34. In October/November 2003 and again in October 2004, Agency inspectors interviewed a former official of the AEOI, said by Iran to have been involved in its centrifuge R&D work from 1987 until he left the Kalaye Electric Company in 2001. During the latter meeting, he provided, in particular, details on the negotiations which had resulted in Iran's procurement around 1987 of the P-1 design (and sample components), and on the supply of the duplicate set of P-1 designs and the components for 500 P-1 centrifuges, delivered through intermediaries to Iran in two shipments said to have taken place in March 1994 and July 1996, and the supply of bellows in 1997 to replace previously provided poor quality bellows. He also confirmed that meetings with the intermediary continued after 1996, and included discussions on technical issues. According to the information provided by Iran, 13 official meetings took place with the clandestine supply network between 1994 and 1999.

35. Iran has been requested to provide information on what, if any, meetings related to Iran's centrifuge programme took place prior to 1994. The Agency has also requested Iran to present the shipping documents associated with the 1994 and 1996 deliveries, and to provide information on the content of the technical discussions held with the intermediaries and explain why no meetings involving AEOI officials took place after June 1999.

36. In addition to its enquiries into Iran's acquisition of enrichment technology, the Agency has conducted extensive environmental sampling (approximately 300 samples) at locations where Iran has

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[10] In a meeting with Agency enrichment technology experts shortly following that letter, the Iranian authorities explained that the tests had involved the 1.9 kg of UF_6 that had been imported in 1991 (and not declared to the Agency until February 2003), the absence of which the Iranian authorities had earlier attempted to conceal by attributing its loss to evaporation due to leaking valves on the bottles containing the gas during their storage in a room under the roof of the Tehran Research Reactor (TRR) building. In a letter dated 4 February 2004, Iran modified its explanation for the contamination, stating that the source probably had been leakage of bottles containing UF_6 which had been produced through R&D conversion activities carried out between 1991 and 1993 (not the UF_6 imported in 1991, as Iran had initially informed the Agency) stored there between 1997 and 1998. The Agency continues to regard as not technically plausible Iran's explanation that the contamination was due to leaking bottles. However, the Agency will only be able to pursue this issue if new information becomes available to it.

declared that centrifuge components were manufactured, processed and/or stored (including Natanz, the Kalaye Electric Company workshop, TNRC, Farayand Technique, Pars Trash and centrifuge component manufacturing workshops in Iran), as necessary, with a view to assessing the correctness and completeness of Iran's declarations concerning its enrichment activities.

37. Analysis of these environmental samples has revealed particles of LEU and HEU[11] indicative of types of nuclear material that are not included in Iran's inventory of declared nuclear material, and has thus called into question the completeness of Iran's declarations about its centrifuge enrichment activities. The Iranian authorities have attributed the presence of these particles to contamination originating from imported centrifuge components. In that context, Iran has stated that it has not enriched uranium beyond 1.2% U-235 using centrifuges.

38. The analytical results from the environmental sampling have been studied carefully by the Agency. The most important observations from the results available to date can be summarized as follows:

a. Domestic components showed predominantly LEU contamination, while imported components showed both LEU and HEU contamination;

b. The contamination at PFEP differed from that found at the Kalaye Electric Company workshop and at its subsidiary Farayand Technique;

c. The samples taken from the imported components that were used in the manufacturing workshops and are now stored at Natanz and Pars Trash, as well as samples taken from the Kalaye Electric Company workshop and the balancing machines used there, showed enrichments up to about 70% U-235, but practically no depleted uranium;

d. The LEU and HEU particles in many samples have an elevated U-236 content that suggests the use of recycled uranium as a feed material; some of the results provided to the Agency by a possible country of origin also have an elevated U-236 content (albeit at a different level);

e. Regarding particles of ~36% U-235 (in the range of 32%–38%):

    (i) 36% U-235 contamination was found at the Kalaye Electric Company workshop (mainly in one room) and on the balancing machines which had been relocated from the workshop to Farayand Technique;

    (ii) at the workshop, there were significantly more particles of 36% U-235 compared to the number of particles of U-235 with other enrichment levels;

f. Numerous particles of ~54% U-235 (in the range of 50%-60%) were found on imported components and on tested rotors assembled using the imported components; some ~54% U-235 contamination was also found at the Kalaye Electric Company workshop; and

g. Some particles of 54% U-235 were found in a sample collected from the chemical traps of the PFEP, which had not yet commenced operation at the time the sample was taken.

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[11] High enriched uranium (HEU) is uranium enriched to 20% or above in the isotope U-235; low enriched uranium (LEU) is uranium enriched to between 0.72% and 20% U-235.

39. Based on the above, and other verification activities of the Agency, the Agency's current assessment regarding the contamination issue is as follows:

- From information provided by the State from which most of the imported P-1 centrifuge components originated, it appears that not all HEU particles found in the samples taken in Iran came from that State;
- It is possible that the domestic components sampled were produced in relatively clean conditions and that they had not been used in an enrichment process but had been contaminated through quality control equipment used on both imported and domestic components;
- It seems plausible that the HEU contamination found at the Kalaye Electric Company workshop and at Natanz may not have resulted from the enrichment of uranium at these particular locations in Iran; however, further investigation is necessary (e.g. on the chemical and physical composition of particles and on samples taken at the point of origin of the components) before a firm conclusion can be drawn.

40. In summary, the Agency's current overall assessment is that the environmental sampling data available to date tends, on balance, to support Iran's statement about the origin of much of the contamination. However, while contamination due to imported components and equipment is one possible explanation, other possible explanations continue to be investigated by the Agency, including the possibility of the contamination having resulted from undeclared enrichment activities conducted by Iran, from imported uranium not declared to the Agency and/or from contaminated equipment imported from sources other than those known to the Agency. The Agency has visited three locations in another State where, according to Iran, the centrifuge components had been located in the mid-1990s. Environmental samples have been taken from the warehouses and from some of the equipment situated there, the analysis of which is in progress.

41. In addition, the Agency has asked to be allowed to sample the centrifuges and centrifuge components at relevant locations in the State from which most of the imported components originated, so that the Agency may independently analyse the samples. Such independent sampling and analysis may enable the Agency to confirm the actual source of contamination and the correctness of statements made by Iran. Consultations on this matter are progressing, and agreement can be expected shortly on the appropriate modalities for such sampling.

P-2 Centrifuge Programme

42. In January 2004, in response to a follow-up inquiry by the Agency on Iran's centrifuge enrichment programme, Iran acknowledged, for the first time, that it had received in 1994 P-2 centrifuge drawings from foreign sources. Iran also stated that the AEOI had concluded a contract with the owner of a private company located in Tehran to develop a P-2 centrifuge, and that some mechanical tests had been conducted, without nuclear material, on a small number of domestically manufactured rotors based on a modified P-2 design. In its communication of 5 March 2004[12], Iran indicated that R&D activities on P-2 centrifuges had not been mentioned in its 21 October 2003 declaration because "Iran intended to submit information on P_2 along with further declarations it is required to provide in accordance with its obligations under the Additional Protocol within the timetable established by the IAEA."

43. In clarifications provided in April and May 2004, Iran stated that the P-2 drawings had been received around 1995, but that, due to a shortage in professional resources and changes in AEOI

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[12] *Reproduced in Agency document INFCIRC/628*

management, priority was placed at that time on resolving difficulties being encountered by Iran in connection with the P-1 centrifuge, and that no actual work on the P-2 centrifuge had commenced until after the contract was concluded in early 2002.

44. The Agency has been able to interview the owner of the private company on a number of occasions since then. According to the contractor, he first saw the design for the P-2 centrifuge in early 2002, and after having received copies and reviewing them, he had decided that, since in his view Iran was not capable of manufacturing maraging steel cylinders with bellows, work should proceed with a shorter, sub-critical carbon composite rotor. He explained further that he had manufactured seven rotors and had performed some mechanical tests on them, but without using nuclear material. He said that the contract was terminated in March 2003, but that he continued to work on his own until June 2003, and that all of the centrifuge equipment had been moved to Pars Trash. In October 2004, the Agency also interviewed the former AEOI official referred to above, who was said to have originally received the P-2 centrifuge design. During these discussions, he described the negotiations that had led to the supply of the P-2 design drawings, which he recalled as having taken place around 1995 or 1996, as well as the reasons for the apparent gap of seven years before the R&D test work on the P-2 design had begun.

45. The Iranian authorities have stated that Iran did not obtain any P-2 centrifuges from abroad, and that the components that it did have had been produced domestically in the contractor's workshop, with the exception of some raw materials and minor items supplied to the contractor by the P-1 R&D team, and a few items which had been purchased from abroad in connection with the P-2 contract, such as bearings, oils and magnets. The contractor acknowledged that he had made enquiries with a European intermediary about the procurement of 4000 magnets with specifications suitable for use in P-2 centrifuges and that he had also mentioned to the intermediary the possibility of much higher numbers in order to attract the supplier and to get a good price by suggesting that larger orders would follow. The Iranian authorities have stated that no magnets were actually delivered by that intermediary to Iran, but that imported magnets relevant to P-2 centrifuges had been procured from other foreign suppliers in 2002.

46. The Agency has reiterated its previous requests for further information from Iran, along with supporting documentation, on the procurement of magnets for the P-2 centrifuges (in particular, on the sources of all such magnets), including attempted procurement and enquiries about procurement, and the procurement of any other relevant components, with a view to facilitating completion by the Agency of its assessment of the P-2 experiments said to have been carried out by the private contractor. In October 2004, Iran provided the Agency with more information in this regard, which is currently being assessed. However, there remains further information requested by the Agency which has yet to be provided.

47. After a number of requests by the Agency, on 19 October 2004, Iran finally provided the Agency with copies of the contract and the report, which had been informally translated by Iran in April 2004. These documents appear to confirm the Iranian statements about the nature of the work requested of and carried out by the contractor between 2002 and 2003.

48. Iran has reiterated that no work was carried out on the P-2 design (or any centrifuge design other than the P-1 design) prior to 2002. The reasons given by Iran for the apparent gap between 1995 and 2002, however, do not provide sufficient assurance that there were no related activities carried out during that period, particularly given that the contractor was able to make the modifications necessary for the composite cylinders within a short period after early 2002 when, according to Iran, he had seen the drawings for the first time. The Agency is attempting to verify this information, inter alia, through the network of suppliers.

A.1.4. Uranium Enrichment – Laser Technology

Development

49. Between 1975 and 1998, Iran concluded with four foreign suppliers contracts related to laser enrichment using both atomic vapour laser isotope separation (AVLIS) and molecular laser isotope separation (MLIS) techniques. In connection with the first two contracts, the Agency has confirmed that the AVLIS spectroscopy equipment Iran received never properly functioned, and that Iran did not receive all of the components of the MLIS equipment.

50. In connection with the third contract, Iran carried out testing in the supplied Laser Separation Laboratory (LSL) and Comprehensive Separation Laboratory (CSL) at TNRC between 1993 and 2000, and dismantled the supplied equipment between 2000 and 2003.

51. With assistance provided by the fourth supplier, Iran established a pilot plant for isotope separation at Lashkar Ab'ad in 2002, where it conducted laser enrichment experiments in December 2002 and January 2003. Iran dismantled the equipment in May 2003. Iran has stated that it currently has no plans to resume the enrichment of uranium using laser isotope separation. It has indicated that it is continuing with its R&D on laser activities, such as those involving copper vapour lasers (CVLs) and Nd:YAG lasers, but that that work is not part of a programme to use such lasers for uranium enrichment.

Findings

52. As with respect to its centrifuge enrichment activities, Iran's responses between February 2003 and October 2003 to the Agency's enquiry into the possible existence in Iran of a laser enrichment programme were characterized by concealment, including the dismantling of the laser enrichment laboratories at TNRC and the pilot laser enrichment plant at Lashkar Ab'ad and the transfer of the equipment and material involved to Karaj, and by failures to declare nuclear material, facilities and activities.

53. Although Iran acknowledged the existence of a substantial programme on lasers in May 2003, it stated that no uranium enrichment related laser activities had taken place in Iran and that it currently had no programme for laser isotope separation. The Agency requested at that time to visit a laser laboratory at Lashkar Ab'ad, which it was allowed to do only in August 2003. During that visit, Iran stated that the laboratory had been devoted to laser fusion research and laser spectroscopy, and reiterated that no nuclear material had been involved in the laser experiments. In early October 2003, the Iranian authorities acknowledged that Iran had imported, and installed at TNRC, laser related equipment imported from two States in 1992 and 2000 in connection with those studies. At that time, Agency inspectors were finally permitted to take environmental samples at Lashkar Ab'ad. The inspectors also visited a warehouse at the AEOI's Nuclear Research Centre for Agriculture and Medicine (NRCAM) at Karaj, and took environmental samples from a large vacuum vessel and associated hardware stored there. The Iranian authorities stated that the equipment had been imported in 2000, that it had never been used, and that it had now been packed for shipment back to the manufacturer, since the contract related to its supply had been terminated by the foreign partner in 2000.

54. In its letter dated 21 October 2003, Iran finally acknowledged that, between 1975 and 1998, it had concluded contracts related to laser enrichment using both AVLIS and MLIS techniques with four

foreign entities[13] In the letter, Iran provided detailed information on the various contracts, and acknowledged that it had carried out laser enrichment experiments using previously undeclared imported uranium metal at TNRC between 1993 and 2000, and that it had established a pilot plant for laser enrichment at Lashkar Ab'ad, where it had also carried out experiments using imported uranium metal. According to information provided subsequently by the Iranian authorities, the equipment used there had been dismantled in May 2003, and transferred to Karaj for storage together with the uranium metal used in the experiments, before the Agency was permitted to visit Lashkar Ab'ad in August 2003. The equipment and material were presented to Agency inspectors at Karaj on 28 October 2003.

55. During the Agency's complementary access to the mass spectrometry laboratories at Karaj in December 2003, the Agency examined two mass spectrometers that had not been included in Iran's declaration of 21 October 2003. Iran acknowledged that the mass spectrometers had been used at Karaj in the past to provide analytical services (isotope enrichment measurements) to the AVLIS programme, and gave the Agency a list of samples that had been analysed. The Agency collected environmental samples from the mass spectrometers; no uranium particles were found in these samples. As requested by the Agency following complementary access at Karaj, Iran submitted additional information to the Agency on 5 January 2004 to clarify the role of the mass spectrometers in relation to Iran's uranium enrichment programme. The laboratory containing the equipment is now part of the safeguarded facility at Karaj.

56. The Agency has reviewed a number of documents provided by Iran in May and August 2004 on the operation of the LSL and CSL prior to their dismantlement in 2000, taken environmental samples, and held discussions with Iranian officials on this matter. The Agency's review indicates that the equipment at the CSL operated fairly well until 1994, when foreign scientists completed their work. According to Iran, "the enrichment separation envisaged in the contract [for the CSL], and in some experiments higher enrichment were achieved in mgr" (the contract provided for "getting one milligram Uranium enriched with 3% concentration of U235 in no longer than eight hours"). As confirmed in an analysis which had been carried out by the foreign laboratory involved in the project, the results of which were given to the Agency by Iran, the highest average enrichment achieved was 8%, and the peak enrichment was 13%. According to the information provided to the Agency, a total of 8 kg of the 50 kg of uranium metal also supplied under the relevant contract (and not previously declared to the Agency), had been used in LSL and CSL experiments. However, according to Iran, 500 g of it was vapourized in the experiments, in the course of which only milligram quantities of enriched uranium were collected. Examination by the Agency of the laboratory notebook and other supporting documents provided by Iran tends to confirm Iran's statement that isotope separation was not successful after 1994, due to continuous technical problems encountered with CVLs, electron beam guns and dye lasers.

57. The contract for the supply of AVLIS equipment to Lashkar Ab'ad was followed by the conclusion of a number of related agreements with the same supplier. Iran has stated that, due to the inability of the supplier to secure export licences for some of the equipment, only some of it, along with some training and documentation, was provided under the contract. Iran has stated that it made attempts to procure the missing equipment, such as additional CVLs and electron beam guns, with limited success. According to Iranian officials, as a consequence of these difficulties, Iran took advantage of the existing CVLs and dye lasers from CSL acquired under the earlier contracts, and installed them in the pilot scale vessel in Lashkar Ab'ad, where it carried out experiments involving about 500 g of the 50 kg of uranium metal referred to above. Iran has declared that enrichment levels

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[13] For a detailed description of these contracts and their implementation, see GOV/2003/75, the report of the Director General to the Board of Governors for its November 2003 meeting.

of 0.8% U-235 were achieved during these experiments. The results of the Agency's analysis to date indicate enrichment levels (0.99% U-235 ± 0.24%) consistent with those declared by Iran.

58. While the contract for the AVLIS facility at Lashkar Ab'ad was specifically written for the delivery of a system that could demonstrably achieve enrichment levels of 3.5% to 7%, it is the opinion of Agency experts that the system, as designed and reflected in the contract, would have been capable of HEU production had the entire package of equipment been delivered. In response to Agency questions in connection with this assessment, Iran referred to the contract and the design parameters contained therein, and provided information demonstrating the very limited capabilities of the equipment actually delivered to Iran under this contract to produce HEU (i.e. only in gram quantities). Iranian AVLIS researchers maintain that they were not aware of the significance of these features when they negotiated and contracted for the supply and delivery of the Lashkar Ab'ad AVLIS facility.

59. The Agency has completed its review of Iran's AVLIS programme and has concluded that Iran's descriptions of the levels of enrichment achieved using AVLIS at the TNRC CSL and at Lashkar Ab'ad and the amounts of material used in its past activities are consistent with information available to the Agency to date. Iran has presented all declared key equipment, which has been verified by the Agency. If, as stated by Iran, the evaporated uranium and some collectors were discarded as waste, mainly at the Qom disposal site, recovery of the small quantities of nuclear material involved would not be feasible and therefore accurate nuclear material accountancy is not possible. The Agency will continue to monitor laser related activities in Iran as a routine safeguards implementation matter.

A.1.5. Fuel Fabrication

Development

60. In 1985, Iran brought into operation a Fuel Fabrication Laboratory (FFL) at Esfahan, about which it informed the Agency in 1993 and for which design information was provided to the Agency in 1998. It is still in operation, and is suitable for producing, on a small scale, fuel pellets.

61. The fuel manufacturing plant to be constructed at Esfahan (FMP) is scheduled to be commissioned in 2007. According to the preliminary design information that has been provided by Iran, the facility is planned to produce 40 t per year of UO_2 fuel (with a maximum enrichment of 5%) for research and power reactors.

62. Iran is also building a Zirconium Production Plant (ZPP) at Esfahan which, when complete, will have a capacity to produce 10 t of zirconium tubing per year.

Findings

63. In a letter dated 5 May 2003, Iran informed the Agency of its plan to commence in 2003 the construction of FMP. On 1 November 2003, Iran submitted preliminary design information for FMP stating that the plant capacity would be 30 t UO_2 per year. On 31 August 2004, Iran submitted updated design information which reflected an increase in plant capacity to 40 t UO_2 per year, declared to have been to accommodate the fuel needs for the Bushehr Nuclear Power Plant (BNPP) (about 25 t UO_2 per year) and the 40 MW pressurized heavy water research reactor (IR-40) (about 10 t UO_2 per year).

A.1.6. Reactor Programme

Development

64. Iran currently has three research reactors in operation[14] under Agency safeguards:

- TRR, located at the TNRC — a 5 MW pool type light water research reactor which has been in operation since the late 1960s; it originally used high enriched uranium aluminium (U/Al) alloy fuel, but was reconfigured in the early 1990s, and now uses fuel of U_3O_8/Al enriched to around 20% U-235;
- The Miniaturized Neutron Source Reactor (MNSR), located at ENTC — a 30 kW light water reactor, in operation since the mid-1990s, that uses U/Al fuel enriched to 90.2% U-235; and
- The Heavy Water Zero Power Reactor (HWZPR), also located at ENTC — a 100 W heavy water reactor, in operation since the mid-1990s, that uses natural uranium metal fuel.

65. In addition, Iran is in the process of constructing the IR-40 at Arak (although originally planned to be built at Esfahan, a decision is said to have been taken in 2002 to build the reactor at Arak instead). The basic design of the IR-40 was completed in 2002, and provides for the use of natural uranium oxide as fuel. It is planned to go into operation in 2014. Iran is also building a heavy water production plant (HWPP) at Arak, and has said that it intends to start producing heavy water there in 2004.

66. Unit 1 of BNPP is a 1000 MW(e) light water reactor designed to use low enriched uranium oxide (up to 5% U-235). It is scheduled to reach first criticality in 2006.

Findings

67. During the Director General's visit to Iran in February 2003, Iran confirmed open source information about the construction of the HWPP. Although no specific information was provided on its intended use, Iran pointed to the possibility of exporting heavy water. In May 2003, Iran informed the Agency about its construction of the IR-40 reactor, and provided the Agency with preliminary design information for the reactor. Iran subsequently informed the Agency that a decision to start R&D for a heavy water reactor programme had been taken in the early 1980s, and that, in the mid-1980s, laboratory scale experiments had been carried out at ENTC on the production of heavy water. Iran further stated that a decision to construct a heavy water reactor had been taken in the mid-1990s.

68. On 12 July 2003, the Iranian authorities made a presentation on the technical features of IR-40, said to have been based on indigenous design. The purpose of the reactor was declared to be research and development and the production of radioisotopes for medical and industrial use. During a visit to Iran in July 2003, Agency inspectors were provided with drawings of the IR-40. The drawings contained no references to hot cells, even though the declared purpose of the facility was radioisotope production. The Agency raised this issue with the Iranian authorities, particularly in light of open source reports of recent efforts by Iran to acquire from abroad heavy manipulators that would be suitable for use in large hot cells.

69. In its letter of 21 October 2003, Iran acknowledged that two hot cells had been foreseen for the reactor project. In that letter, Iran also made reference to its plans for nine hot cells for the production of radioisotopes (molybdenum, iodine, xenon, cobalt-60 and iridium-192); specifically, "four for the production of radioisotopes, two for the production of cobalt and iridium and three for waste

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[14] Iran also has at Esfahan a light water sub-critical reactor (LWSCR) using uranium metal fuel, which operates a few days out of the year, and a decommissioned graphite sub-critical reactor (GSCR) which also used uranium metal fuel.

management processing" (along with ten back-up manipulators). According to the information provided in that letter, however, neither the design nor detailed information about the dimensions or the actual layout of the hot cells were available yet, since the Iranian authorities did not know the characteristics of the manipulators and lead glass shielding windows which they could procure. In the IR-40 design information provided by Iran in November 2003, Iran confirmed that it had tentative plans for a building, in the proximity of the IR-40 facilities, with hot cells for the production of "long lived radioisotopes"[15]. Iran agreed to submit the relevant preliminary design information with respect to that building in due course. In May 2004, Iran provided updated design information for the reactor, in which it noted that the planning of hot cells for "long lived radioisotopes" was no longer under consideration in light of difficulties with the procurement of equipment.

70. In August 2004, Iran presented to the Agency detailed drawings that Iran had received from a foreign company in 1977 for hot cells that were to have been constructed at Esfahan. Iran stated that it had not yet made more detailed plans for hot cells for the IR-40 complex at Arak, but that it had used information from those drawings as the basis for specifications in its efforts to procure manipulators for hot cells intended for the production of cobalt and iridium isotopes. In a letter dated 19 August 2004 Iran reconfirmed the nine hot cell project at Arak. During its October 2004 visit to Iran, the Agency showed Iran evidence of Iran's enquiries about the purchase of hot cell manipulators and lead glass windows, and requested clarification of how such precise and detailed specifications could have been provided on a procurement request if no preliminary hot cell designs existed. In response, Iran gave the Agency documents relevant to other enquiries about lead glass windows. Iran reiterated, however, that the specifications it had used for its enquiries had been based on designs provided by a foreign supplier in the 1970s, as well as on its own experience with the hot cells at the MIX Facility (a laboratory for the production of radioisotopes of molybdenum, iodine and xenon from natural uranium oxide) at TNRC. Iran provided a sketch of the hot cells with a calculated capability of handling activity levels from 100 to 10 000 curies (3.7 to 370 TBq). However, Iran stated that the design would be completed only upon successful procurement by Iran of manipulators and lead glass windows. The Agency has received some of the requested information from Iran, which it is assessing, but is still awaiting other information.

A.1.7. Reprocessing

Development

71. Between 1988 and 1993, Iran carried out plutonium separation experiments at TNRC. The shielded glove boxes in which these experiments were carried out were dismantled in 1993, relocated to JHL and used for other purposes. In 1995, Iran started constructing the MIX Facility. However, as the neutron flux of TRR is not sufficient for the production of the radioisotopes referred to above using natural uranium targets, the facility has not yet been commissioned.

Findings

72. In its letter of 21 October 2003, Iran acknowledged the irradiation of depleted UO_2 targets at TRR and subsequent plutonium separation experiments in shielded glove boxes in the Nuclear Safety Building of TNRC. Neither the activities nor the separated plutonium had been reported previously to the Agency.

73. In meetings held in Iran between 27 October and 1 November 2003, Iran provided additional information about these experiments. According to Iranian officials, the experiments took place between 1988 and 1993, and involved pressed or sintered UO_2 pellets prepared at ENTC using

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[15] Cobalt-60 and iridium-192 have half-lives of 5.2 years and 74 days, respectively.

depleted uranium that had been exempted from safeguards in 1978. Iran stated that the capsules containing the pellets had been irradiated in TRR in connection with a project to produce fission product isotopes of molybdenum, iodine and xenon, and that some of the capsules had been processed and the plutonium separated. The plutonium separation was carried out at TNRC in three shielded glove boxes, which, according to Iran, were dismantled in 1993 and moved to the JHL building, where the glove boxes were used for iodine production until 1999. They were dismantled in 1999, decontaminated and sent to ENTC in 2000, where they have been stored along with related equipment since then. Iran has stated that these experiments were carried out to learn about the nuclear fuel cycle, and to gain experience in reprocessing chemistry.

74. On 8 November 2003, the Agency was able to take samples from the separated plutonium, which was presented to the Agency in the form of plutonium solution contained in two bottles, one of which had completely leaked out of its container. During their inspection at JHL, Agency inspectors were also shown four heavily shielded containers said by Iran to contain the unprocessed irradiated targets. The containers had been buried on the site of TNRC, but were dug up and presented to the Agency for verification. Using available non-destructive analysis equipment, Agency inspectors were able to confirm that one of the containers (selected at random) contained highly radioactive material characteristic of irradiated targets. All four containers have been placed under Agency seal for future examination.

75. However, on the basis of information available to it as of November 2003, the Agency concluded: that the amount of separated plutonium declared by Iran had been understated (quantities in the milligram range rather than the microgram range as stated by Iran); that the plutonium samples taken from a glove box said to have been involved had plutonium-240 (Pu-240) abundance higher than that found in the plutonium solution bottles presented; that there was an excess amount of americium-241 (Am-241) in the samples; and that the age of the plutonium solution in the bottles appeared to be less than the declared 12–16 years.

76. On the basis of a subsequent recalculation carried out by it using corrected irradiation data and a corrected equation, Iran acknowledged in May 2004 that its theoretical estimations of the quantities of plutonium produced had been understated (micrograms rather than milligrams) and accepted the Agency's estimate of about 100 mg as having been correct.

77. Iran has stated that the plutonium with higher Pu-240 abundance originated from work carried out between 1982 and 1984 at the TNRC Radiochemistry Laboratory on the production of smoke detectors using Am-241. Iran stated that the Am-241 had been imported from abroad prior to the Iranian revolution in 1979, and explained that, in 1990, the glove box that had been used in connection with the Am-241 had been transferred to the building where the plutonium separation took place, but that it had been used for training purposes and not for plutonium experiments. This work, in Iran's view, not only explained the Pu-240 contaminant, but also the high Am-241 content in the samples. According to Iran, the glove box involved in this work, along with other glove boxes, was moved in 2000 to a warehouse at ENTC.

78. The age of the plutonium solutions was discussed during meetings that took place in early August 2004. The Agency explained in detail the methodology it had used for dating the plutonium that had been separated, and additional on going work to validate the results. The Iranian officials reiterated their previous statement that the experiments had been completed in 1993 and that no plutonium had been separated since then. The Agency agreed to further analyse the available data. On 15 September 2004, a new set of samples was taken from the plutonium solution. The preliminary results of the analyses of the samples thus far are the same as those previously obtained, indicating that the plutonium could have been separated after 1993. On 29 October 2004, the Agency requested additional clarifications, which are needed for a final assessment.

A.1.8. Polonium-210

Development

79. Between 1989 and 1993, Iran irradiated two bismuth targets, and attempted to extract polonium from one of them, at TRR as part of a feasibility study for the production of neutron sources. Iran has stated that it does not have a project either for the production of Po-210 or for the production of neutron sources using Po-210 and that "there [had] not been in the past any studies or projects on the production of neutron sources using Po-210".

Findings

80. In September 2003, the Agency noticed from TRR operating records that bismuth metal samples had been irradiated during the same general period as the reprocessing experiments had been carried out (1989–1993). Although bismuth is not nuclear material requiring declaration under a comprehensive safeguards agreement, the irradiation of bismuth is of interest to the Agency as it produces polonium-210 (Po-210), an intensely radioactive alpha emitting radioisotope[16] that can be used not only for certain civilian applications (such as radioisotope thermoelectric generators (RTGs), in effect, nuclear batteries[17]), but also, in conjunction with beryllium, for military purposes (specifically, as a neutron initiator in some designs of nuclear weapons).

81. In a letter to the Agency dated 17 November 2003, Iran informed the Agency that the bismuth irradiation had been to produce radioisotope batteries, and not neutron sources. During its visits to Iran in November and December 2003, the Agency requested further clarification and, in January 2004, was able to interview two Iranian scientists involved in the bismuth irradiation. According to the scientists, two bismuth targets had been irradiated, and an attempt had been made, unsuccessfully, to extract polonium from one of them. The other irradiated bismuth target was said to have been discarded. A statement submitted to the Agency by one of the scientists confirmed that these activities had been part of a scientific "project to carry out a feasibility study on the production [and] use of radioisotope batteries."

82. In February 2004, Iranian officials said that the experiments had also been part of a study about neutron sources, but that, as there were few remaining records related to the project, Iran was not able to provide evidence to support its claims as to the stated purpose. However, Iran provided the Agency with a document reflecting the approval of the project (by TNRC management) in which reference is made to these applications. In the meeting on 21 May 2004, Iranian authorities continued to maintain that the purpose of the bismuth irradiation had been to produce pure Po-210 on a laboratory scale, noting that, if production and extraction of Po-210 were successful, it could be used in radioisotope thermoelectric batteries, as was the case in the SNAP-3 application (a US developed power source for use in space probes).

83. The Agency has requested access to the glove box used for the Po-210 separation; however, according to Iran, the glove box has been discarded. The Agency has also requested to see the original project proposal by the scientists involved seeking permission to carry out the project. Iran has stated that the original documentation could not be found, and has provided instead a document which it has certified as being a "correct accurate and authentic" copy.

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[16] Po-210 has a half-life of 138 days.

[17] The reported applications of Po-210 based RTGs are limited in number.

84. The Agency does not have any concrete information that is contrary to the statements made by Iran. It remains, however, somewhat uncertain regarding the plausibility of the stated purpose of the experiments given the very limited applications of short lived Po-210 sources.

A.2. Implications

85. Based on all information currently available to the Agency, it is clear that Iran has failed in a number of instances over an extended period of time to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material, its processing and its use, as well as the declaration of facilities where such material has been processed and stored. In his June, August and November 2003 reports to the Board of Governors (GOV/2003/40, GOV/2003/63, and GOV/2003/75), the Director General identified a number of instances of such failures and the corrective actions that were being, or needed to be, taken with respect thereto by Iran.

86. As assessed in light of all information available to date, these failures can now be summarized as follows:

a. Failure to report:

(i) the import of natural uranium in 1991, and its subsequent transfer for further processing;

(ii) the activities involving the subsequent processing and use of the imported natural uranium, including the production and loss of nuclear material where appropriate, and the production and transfer of waste resulting therefrom;

(iii) the use of imported natural UF_6 for the testing of centrifuges at the Kalaye Electric Company workshop in 1999 and 2002, and the consequent production of enriched and depleted uranium;

(iv) the import of natural uranium metal in 1993 and its subsequent transfer for use in laser enrichment experiments, including the production of enriched uranium, the loss of nuclear material during these operations and the production and transfer of resulting waste;

(v) the production of UO_2, UO_3, UF_4, UF_6 and ammonium uranyl carbonate (AUC) from imported depleted UO_2, depleted U_3O_8 and natural U_3O_8, and the production and transfer of resulting wastes; and

(vi) the production of natural and depleted UO_2 targets at ENTC and their irradiation in TRR, the subsequent processing of those targets, including the separation of plutonium, the production and transfer of resulting waste, and the storage of unprocessed irradiated targets at TNRC.

b. Failure to declare:

(i) the pilot enrichment facility at the Kalaye Electric Company workshop; and

(ii) the laser enrichment plants at TNRC and the pilot uranium laser enrichment plant at Lashkar Ab'ad.

c. Failure to provide design information, or updated design information, for:

(i) the facilities where the natural uranium imported in 1991 (including wastes generated) was received, stored and processed (JHL, TRR, ENTC, waste storage facility at Esfahan and Anarak);

(ii) the facilities at ENTC and TNRC where UO_2, UO_3, UF_4, UF_6 and AUC from imported depleted UO_2, depleted U_3O_8 and natural U_3O_8 were produced;

(iii) the waste storage at Esfahan and at Anarak, in a timely manner;

(iv) the pilot enrichment facility at the Kalaye Electric Company workshop;

(v) the laser enrichment plants at TNRC and Lashkar Ab'ad, and locations where resulting wastes were processed and stored, including the waste storage facility at Karaj; and

(vi) TRR, with respect to the irradiation of uranium targets, and the facility at TNRC where plutonium separation took place, as well as the waste handling facility at TNRC.

d. Failure on many occasions to cooperate to facilitate the implementation of safeguards, as evidenced by extensive concealment activities.

87. As corrective actions, Iran has submitted inventory change reports (ICRs) relevant to all of these activities, provided design information with respect to the facilities where those activities took place, and presented all declared nuclear material for Agency verification, and it undertook in October 2003 to implement a policy of cooperation and full transparency.

88. Further corrective actions may be identified by the Agency as a consequence of assessments that are still ongoing.

B. Cooperation

B.1. Cooperation in the Implementation of the Safeguards Agreement and Additional Protocol

89. As indicated above, Iran's cooperation up to October 2003 was marked by extensive concealment, misleading information and delays in access to nuclear material and facilities, for example, in connection with its imports of nuclear material and its enrichment activities at the Kalaye Electric Company workshop and at Lashkar Ab'ad.

90. As also indicated above, following the adoption of the Board's resolution of 12 September 2003 (GOV/2003/69), Dr. Rohani informed the Director General on 16 October 2003 that a decision had been taken by Iran to provide the Agency, in the course of the following week, with a full disclosure of Iran's past and present nuclear activities. In his letter to the Director General dated 21 October 2003, Mr Aghazadeh reaffirmed that "the Islamic Republic of Iran ha[d] decided to provide a full picture of its nuclear activities, with a view to removing any ambiguities and doubts about the exclusively peaceful character of these activities and commencing a new phase of confidence and co-operation in this field at the international level." Mr. Aghazadeh stated further in his letter that Iran was prepared "to provide, in full transparency, any additional clarifications that the Agency may deem necessary."[18] Included with the letter was extensive information on Iran's past

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[18] In his letter, Mr. Aghazadeh also referred to his Government's expectation that the Agency would "take cognisance, in preparing its report, of Iran's concerns and constraints for the full disclosure of detailed information about these activities in the past, notably the concern about expansion of illegal sanctions to prevent Iran from exercising its inalienable right to nuclear technology for peaceful purposes stipulated in Article IV of the [Treaty on the Non-Proliferation of Nuclear Weapons]."

enrichment activities and its experiments in uranium conversion as well as in plutonium separation. While considerable progress has been made since then in some areas, the Agency is still in the process of assessing some of the information provided in that letter and in subsequent clarifications.

91. As had also been foreseen by Dr. Rohani on 16 October 2003, an Additional Protocol to Iran's Safeguards Agreement was signed on 18 December 2003. According to Iran, entry into force of the Additional Protocol will require, inter alia, ratification of the text, which has not yet taken place. Notwithstanding, as undertaken in its letter to the Agency of 10 November 2003, Iran has continued to act as if its Additional Protocol is in force.

92. On 21 May 2004, Iran submitted initial declarations pursuant to its Additional Protocol. In forwarding the declarations, Iran informed the Agency that they were being submitted "prior to the due date of 18 June 2004", following the Director General's request during his visit to Iran in April 2004. On 6 September 2004, Iran submitted an update of its declarations.

93. The Agency's comments on Iran's declarations were discussed with Iran in July, August and October 2004. These discussions have also provided an opportunity for the Agency to respond to requests for clarification sought by Iran on the interpretation of some of the provisions of the Additional Protocol. At the request of the Agency, a number of revisions have been submitted by Iran.

94. Since October 2003, Iran's cooperation has improved appreciably, although information has continued in some cases to be slow in coming and provided in reaction to Agency requests. Since December 2003, Iran has facilitated in a timely manner Agency access under its Safeguards Agreement and Additional Protocol to nuclear materials and facilities, as well as other locations in the country, and has permitted the Agency to take environmental samples as requested by the Agency.

95. Iran has, however, applied broad restrictions on the Agency's use of its own equipment to take photographs and the removal of photographs from Iran to Vienna (for use in assessment and as inspection baseline documentation). While the Agency would also like to record its meetings in Iran, Iran has agreed to make copies of its own tapes for the Agency, and to keep them under Agency seal in Iran. These constraints have made it more difficult for the Agency, at its Headquarters in Vienna, to conduct subsequent analysis and accurate assessments of the results of meetings in Iran.

B.2. Transparency Visits and Discussions

96. In line with its announced policy to provide, in full transparency, any additional clarifications that the Agency may deem necessary, Iran has, since October 2003, provided the Agency, on a voluntary basis, with access to certain additional information and locations requested by the Agency, in the interest of confidence building.

97. On 5 October 2003, the Agency visited three locations at an industrial complex in Kolahdouz in western Tehran that had been mentioned in open source reports as relevant to enrichment activities. While no work was seen at those locations that could be directly linked to uranium enrichment, environmental samples were taken. The results did not reveal any indications of activities involving the use of nuclear material.

98. During the June 2004 meeting of the Board of Governors, the Agency asked Iran to provide, in the interest of transparency, access to the Lavisan-Shian site, in view of the reference made during the Board meeting to that site in connection with alleged nuclear related activities carried out at that site (including the presence of whole body counters) and the possibility of a concealment effort by Iran to hide these activities through the removal of all of the buildings from the site after November 2003.

99. Iran has stated that the site had been razed in response to a decision ordering the return of the site to the Municipality of Tehran in connection with a dispute between the Municipality and the Ministry

of Defence. In response to a request by the Agency, Iran provided additional documentation in support of this explanation, which is currently being assessed. Between 28 and 30 June 2004, the Agency visited the Lavisan-Shian site, where it took environmental samples. The Agency also took environmental samples from two whole body counters (one formerly located at Lavisan-Shian, the other located at Esfahan), and a trailer said to have contained one of the counters while it was located at Lavisan-Shian. Though Iran's description of events concerning the whole body counters, as related to this site, appears to be plausible, the trailer said to have contained the other counter still remains to be presented for sampling.

100. Iran provided a description and chronology of three organizations that had been located at Lavisan-Shian between 1989 and 2004. As described by Iran, the Physics Research Centre (PHRC) had been established at that site in 1989, the purpose of which had been "preparedness to combat and neutralization of casualties due to nuclear attacks and accidents (nuclear defence) and also support and provide scientific advice and services to the Ministry of Defence." Iran provided a list of eleven activities conducted at the PHRC, but, referring to security concerns, declined to provide a list of the equipment used at the Centre. In a letter to the Agency dated 19 August 2004, Iran stated further that "no nuclear material declarable in accordance with the Agency's safeguard[s] was present" and reiterated its earlier statement that "no nuclear material and nuclear activities related to fuel cycle were carried out at Lavisan-Shian."

101. Iran explained that the activities of the PHRC at Lavisan had been stopped in 1998, and that the Centre had been changed to the Biological Study Centre, which was involved in biological R&D and "radioprotection" activities. According to Iran, in 2002, the Applied Physics Institute was also located at that site, and although some of the biological activities continued there, the main objective was to use the capabilities of universities in the country (in particular, at the Malek Ashtar University near Esfahan) for the education and R&D needs of the Ministry of Defence.

102. The vegetation and soil samples collected from the Lavisan-Shian site have been analysed, and reveal no evidence of nuclear material. It should be borne in mind, however, that detection of nuclear material in soil samples would be very difficult in light of the razing of the site. In addition, given the removal of the buildings, the Agency is not in a position to verify the nature of activities that have taken place there.

103. In October 2004, Iran provided some information to the Agency in response to its request for information concerning efforts by the PHRC to acquire dual use materials and equipment that could be useful in uranium enrichment or conversion activities. The Agency is awaiting additional information and clarifications from Iran regarding this matter.

104. In accordance with Agency practice in connection with its evaluation of other States' nuclear programmes, the Agency has discussed with the Iranian authorities open source information relating to dual use equipment and materials which have applications in the conventional military area and in the civilian sphere as well as in the nuclear military area.

105. The acquisition of such equipment and materials by Iran was again discussed with Iranian officials in October 2004, at which time the Agency reiterated its request, in the interest of transparency, for a visit to a site located at Parchin in order to provide assurance regarding the absence of undeclared nuclear material and activities at that site. In order to respond to Iran's concerns about such a transparency visit, the Agency sent on 25 October 2004 a note outlining modalities under which the visit could take place.

C. Current Overall Assessment

106. Iran has made substantial efforts over the past two decades to master an independent nuclear fuel cycle. To that end, Iran has conducted experiments to acquire the know-how for almost every aspect of the fuel cycle. Iran's current nuclear programme, as the Agency understands it, is aimed, upon completion, at an independent front end of the nuclear fuel cycle, including uranium mining and milling, conversion, enrichment, fuel fabrication, a light water reactor, heavy water production, a heavy water research reactor and associated R&D facilities. Iran has also performed some laboratory scale experiments related to the reprocessing of irradiated fuel, and is carrying out R&D in the treatment, storage and disposal of radioactive waste.

107. Many aspects of Iran's nuclear fuel cycle activities and experiments, particularly in the areas of uranium enrichment, uranium conversion and plutonium separation, were not declared to the Agency in accordance with Iran's obligations under its Safeguards Agreement. Iran's policy of concealment continued until October 2003, and has resulted in many breaches of its obligation to comply with that Agreement. Since that time, good progress has been made in Iran's correction of those breaches and in the Agency's ability to confirm certain aspects of Iran's current declarations, which will be followed up as a routine safeguards implementation matter.

108. There remain two important issues relevant to the Agency's investigation in order to provide assurance that there are no undeclared enrichment activities in Iran: the origin of LEU and HEU particle contamination found at various locations in Iran; and the extent of Iran's efforts to import, manufacture and use centrifuges of both the P-1 and P-2 designs.

109. With respect to the first issue, contamination, since the issuance of the last report to the Board, the Agency and the State from which most of the imported P-1 centrifuges originated have, in a cooperative effort, continued to share their respective analytical results. These results generally do not contradict the results from samples taken in Iran. The Agency's current overall assessment with respect to this issue is that the environmental sampling data available to date tends, on balance, to support Iran's statement about the foreign origin of much of the observed contamination. However, other possible explanations cannot be excluded at this point in time, and the Agency is continuing this investigation in an effort to confirm the actual source of contamination. Independent sampling and analysis may enable the Agency to confirm the correctness of statements made by Iran in this regard. Consultations with the State concerned on this matter are progressing, and agreement can be expected shortly on the appropriate modalities for such sampling.

110. With respect to the second issue, further investigation is required into the clandestine supply network in order for the Agency to be able to conclude its assessment on the extent of Iran's centrifuge enrichment programme, taking into account additional information that Iran has provided on its meetings with network intermediaries. A number of States have provided significant support to the Agency through the supply of information on Iran's use of intermediaries for procurement. In addition, consultations are under way with the State from which the P-1 and P-2 centrifuge technology obtained by Iran originated. One aspect of this investigation is related to Iran's statement that it did not pursue any work on the P-2 design between 1995 and 2002, as the reasons given by Iran for the apparent gap do not provide sufficient assurance that there were no related activities carried out during that period.

111. The Agency is still assessing other aspects of Iran's past nuclear programme, including statements made by it about plutonium separation experiments, in particular with respect to the dates they were carried out. In addition, while Iran has provided preliminary design information on the IR-40 heavy water research reactor, the construction of which should commence in 2004, the Agency has raised some questions regarding Iran's attempts to acquire manipulators and lead glass windows for

the hot cells. With respect to the latter issue, in October and November 2004, Iran provided some clarifications, which are now being assessed.

112. All the declared nuclear material in Iran has been accounted for, and therefore such material is not diverted to prohibited activities. The Agency is, however, not yet in a position to conclude that there are no undeclared nuclear materials or activities in Iran. The process of drawing such a conclusion, after an Additional Protocol is in force, is normally a time consuming process. In view of the past undeclared nature of significant aspects of Iran's nuclear programme, and its past pattern of concealment, however, this conclusion can be expected to take longer than in normal circumstances. To expedite this process, Iran's active cooperation in the implementation of its Safeguards Agreement and Additional Protocol, and full transparency, are indispensable. The assistance and cooperation of other States, as indicated above, is also essential to the resolution of the outstanding issues.

113. The Agency continues to follow up on open source reports relevant to Iran's nuclear programme. In this regard, it should be noted that the focus of Agency Safeguards Agreements and Additional Protocols is nuclear material, and that, absent some nexus to nuclear material, the Agency's legal authority to pursue the verification of possible nuclear weapons related activity is limited. However, in accordance with its practice in connection with its evaluation of other States' nuclear programmes, the Agency has continued to pursue, with Iran's cooperation, open source reports relating to dual use equipment and materials which have applications in the conventional military area and in the civilian sphere as well as in the nuclear military area. Iran has permitted the Agency, as a confidence building measure, to visit a number of defence related sites, including Kolahdouz and Lavisan. While the Agency found no nuclear related activities at Kolahdouz, it is still assessing information (and awaiting some additional information) in relation to the Lavisan site. The Agency is also still waiting to receive permission to visit the Parchin site.

114. The Secretariat will continue its investigation of all remaining outstanding issues relevant to Iran's nuclear programme, and the Director General will continue to report to the Board as appropriate.

II. OTHER REQUESTS BY THE BOARD: SUSPENSION

115. As reflected in paragraph 8 of GOV/2004/79, the Board of Governors has requested the Director General to submit a report on "Iran's responses to the requests made of it by the Board in previous resolutions, especially requests relating to full suspension of all enrichment related and reprocessing activities".

116. The Board of Governors has adopted five resolutions[19], and approved one summary of the Chairman[20], in which it has made a number of requests of Iran. These requests may be summarized as falling within one or more of the following:

a. Requests that Iran comply with its obligations under its Safeguards Agreement, resolve all outstanding issues (including those related to LEU and HEU contamination, the nature and scope of Iran's P-2 centrifuge and laser enrichment programmes and the Po-210 experiments), take corrective measures and provide the access to locations and personnel and to information required of it under its Safeguards Agreement, including by providing full declarations on its past and present nuclear programme, in particular its enrichment programme and with respect to its conversion experiments, and by permitting environmental sampling;

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[19] The resolutions of the Board in connection with the implementation of the NPT Safeguards Agreement in Iran are reproduced in: GOV/2004/79, dated 18 September 2004; GOV/2004/49, dated 18 June 2004; GOV/2004/21, dated 13 March 2004; GOV/2003/81, dated 26 November 2003; and GOV/2003/69, dated 12 September 2003.

[20] GOV/OR.1072 (19 June 2003), paras 52–58.

b. Requests that Iran sign, ratify and fully implement a Protocol Additional to its Safeguards Agreement, based on the Model Additional Protocol, and, as a confidence-building measure, to act in accordance with the Additional Protocol pending its entry into force, including by complying with the deadline for declarations envisaged in Article 3 of the Protocol;

c. Requests for transparency and cooperation with the Agency; and

d. Requests that Iran suspend all enrichment related and reprocessing activities, including that it reconsider its decisions to begin production testing at UCF; associated with these requests are the Board's requests that Iran not introduce nuclear material into PFEP and that it reconsider its decision to begin production testing at UCF and its decision to start construction of a heavy water research reactor.[21]

117. Section I of this report addresses Iran's response to the requests referred to in sub-paragraphs (a) through (c) above. In Section II, Iran's responses to the requests of the Board in connection with the suspension by Iran of enrichment related and reprocessing activities, summarized in sub-paragraph (d) above, are discussed.

A. Scope of suspension

118. As reflected in the Chairman's summary of the Board's deliberations on this matter in June 2003, the Board at that time "encouraged Iran, pending the resolution of related outstanding issues, not to introduce nuclear material at the pilot enrichment plant as a confidence building measure." On 12 September 2003, in resolution GOV/2003/69, the Board reiterated this statement and, in that context, called on Iran "to suspend all further uranium enrichment related activities, including the further introduction of nuclear material into Natanz, and, as a confidence building measure, any reprocessing activities, pending provision by the Director General of the assurances required by Member States, and pending satisfactory application of the provisions of the additional protocol."

119. On 10 November 2003, the Iranian Government informed the Director General that it had decided to suspend, with effect from that date, all enrichment related and reprocessing activities in Iran, and specifically, to suspend all activities on the site of Natanz, not to produce feed material for enrichment processes and not to import enrichment related items.

120. In its resolution GOV/2003/81, adopted on 26 November 2003, the Board welcomed Iran's decision voluntarily to suspend all enrichment related and reprocessing activities, requested Iran to adhere to it in a complete and verifiable manner, and endorsed the Director General's acceptance of Iran's invitation to verify implementation of that decision and report thereon.

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[21] GOV/OR.1072, para. 54; GOV/2003/69, para. 3; GOV/2003/81, para. 10; GOV/2004/21, para. 3; GOV/2004/49, paras 7 and 8; and GOV/2004/79, paras 3 and 4.

121. In a Note Verbale dated 29 December 2003, Iran informed the Agency that:

- it would suspend the operation and/or testing of any centrifuges, either with or without nuclear material, at PFEP;
- it would suspend further introduction of nuclear material into any centrifuges;
- it would suspend installation of new centrifuges at PFEP and installation of centrifuges at the FEP; and
- it would withdraw nuclear material from any centrifuge enrichment facility if and to the extent practicable.

122. In its Note Verbale, Iran stated further: that it did not currently have any type of gas centrifuge enrichment facility at any location in Iran other than the facility at Natanz that it was now constructing, nor did it have plans to construct, during the suspension period, new facilities capable of isotopic separation; that it had dismantled its laser enrichment projects and removed all related equipment; and that it was not constructing or operating any plutonium separation facility.

123. Iran also stated in its Note Verbale that, during the period of suspension: Iran did not intend to make new contracts for the manufacture of centrifuge machines and their components; the Agency could fully supervise storage of all centrifuge machines assembled during the suspension period; Iran did not intend to import centrifuge machines or their components, or feed material for enrichment processes, during the suspension period; and "[t]here is no production of feed material for enrichment processes in Iran."

124. On 24 February 2004, Iran informed the Agency that instructions would be issued by the first week of March to implement the further decisions voluntarily taken by Iran to: (i) suspend the assembly and testing of centrifuges, and (ii) suspend the domestic manufacture of centrifuge components, including those related to the existing contracts, to the furthest extent possible. Iran also informed the Agency that any components that were manufactured under existing contracts that could not be suspended would be stored and placed under Agency seal. Iran invited the Agency to verify these measures. Iran also confirmed that the suspension of enrichment activities applied to all facilities in Iran.

125. In resolution GOV2004/21, adopted on 13 March 2004, the Board called on Iran to extend the application of its commitment on suspension to "all enrichment related and reprocessing activities throughout Iran, and requested the Director General to verify the full implementation of these steps."

126. On 15 March 2004, Iran notified the Agency that the Agency's verification of the suspension of centrifuge component production could begin as of 10 April 2004. However, due to disputes between the AEOI and some of its private contractors, three private companies would continue with centrifuge component production.

127. In a letter dated 29 April 2004, Iran informed the Agency that it intended to conduct hot tests of the UF_6 production line at UCF. On 7 May 2004, the Agency wrote to Iran, informing it that, given the amounts of nuclear material involved, the hot testing of UCF with UF_6 gas would technically amount to the production of feed material for enrichment processes. In a letter dated 18 May 2004, Iran informed the Agency that "Iran has not, at any time, made any undertaking not to produce feed material for the enrichment process. The decision taken for voluntary and temporary suspension is based on clearly defined scope which does not include suspension of production of UF_6."

128. On 21 May 2004, Iran and the Agency were able to reach agreement on the Agency's proposal regarding the frequency of visits during the following twelve months for Agency verification of the

suspension of the production of gas centrifuge enrichment components at the nine sites declared by Iran as having been engaged in such activities.

129. On 18 June 2004, in resolution GOV/2004/49, the Board called on Iran "immediately to correct all remaining shortcomings, and to remove the existing variance in relation to the Agency's understanding of the scope of Iran's decisions regarding suspension, including by refraining from the production of UF_6 and from all production of centrifuge components, as well as to enable the Agency to verify fully the suspension." In the context of Iran's voluntary decisions to suspend all enrichment related and reprocessing activities, the Board also called on Iran, "as a further confidence building measure, voluntarily to reconsider its decision to begin production testing at [UCF] and also, as an additional confidence building measure, to reconsider its decision to start construction of a research reactor moderated by heavy water, as the reversal of those decisions would make it easier for Iran to restore international confidence undermined by past reports of undeclared nuclear activities in Iran."

130. On 23 June 2004, the Director General received a letter from Iran informing him that Iran "plan[ned] to suspend implementation of the expanded voluntary measures conveyed in [its] Note dated 24 February 2004" and that Iran "thus, intend[ed] to resume, under IAEA supervision, manufacturing of centrifuge components and assembly and testing of centrifuges as of 29 June 2004." In the letter, Iran requested the Agency "to take steps that may be necessary to enable resumption of such operations as of 29 June." On 29 June 2004, the Agency received a letter forwarding a list of seals which would be removed from material, components and equipment related to centrifuge component manufacturing and assembling. In a letter dated 29 June 2004, the Agency acknowledged receipt of Iran's letter and agreed to the removal of the seals by the operator in the absence of Agency inspectors.

131. On 18 September 2004, the Board of Governors adopted resolution GOV/2004/79, in which it requested Iran, inter alia, to "immediately suspend all enrichment-related activities, including the manufacture or import of centrifuge components, the assembly and testing of centrifuges and the production of feed material, including through tests or production at the UCF, under Agency verification." The Board also called again on Iran "as a further confidence building measure, voluntarily to reconsider its decision to start construction of a research reactor moderated by heavy water."

132. In a letter dated 14 November 2004, the Government of Iran notified the Director General that, in the context of an agreement reached on 14 November 2004 between the Government of Iran and the Governments of France, Germany and the United Kingdom, and the High Representative of the European Union, Iran had "decided, on a voluntary basis and as further confidence building measure, to continue and extend its suspension to include all enrichment related and reprocessing activities, and specifically: the manufacture and import of gas centrifuges and their components; the assembly, installation, testing or operation of gas centrifuges; and all tests and production for conversion at any uranium conversion installation". In its letter, Iran "recall[ed] and reconfirm[ed] that Iran does not have any reprocessing activity" or "any activity for undertaking plutonium separation, or for constructing or operating any plutonium separation installation". In addition, Iran stated that "material at Isfahan UCF will be brought to a safe, secure and stable state, not beyond UF_4, in coordination with the Agency." Iran invited the Agency to verify this suspension starting from 22 November 2004.

B. Monitoring activities

133. The Agency has continued its monthly monitoring activities at PFEP, most recently from 9 to 11 October 2004, to ensure that the suspension of enrichment activities at PFEP is fully implemented. The surveillance records from the cascade hall have been reviewed to ensure that no additional centrifuge machines were installed. The seals on the equipment and nuclear material have been verified to ensure that they have not been tampered with, then replaced. The cascade hall continues to be under Agency surveillance and all the previously declared UF_6 feed material remains under Agency seal. Other activities conducted by the Agency in connection with the monitoring of Iran's suspension undertakings have included:

- DIV at FEP;
- monitoring of the decommissioned status of the AVLIS pilot plant at Lashkar Ab'ad through complementary access;
- inspections at JHL; and
- visits to several workshops where centrifuge components had been manufactured and/or stored, including the Kalaye Electric Company workshop.

134. The seals that had been used by the Agency as one of the measures for monitoring Iran's suspension of the manufacture, assembly and testing of centrifuge components at Natanz, Pars Trash and Farayand Technique were removed by Iran and returned to the Agency during its visit to Iran between 6 and 18 July 2004. As of mid-August 2004, about 70 rotors had been newly assembled and tested, and were shown to the Agency; by 10 October 2004, a total of 135 new rotors had been assembled, bringing the total number of assembled rotors at Natanz to 1274. The Agency is currently discussing with Iran the necessary arrangements for the Agency to monitor the manufacturing of centrifuge components and the assembly and testing of centrifuges, as contemplated in Iran's letter of 23 June 2004. In that regard, the Agency has proposed that it seal the tested rotors, a measure which Iran has not accepted to date. It must be noted that, in the absence of such seals, the Agency's monitoring of these activities cannot be considered effective.

135. During the Agency's October 2004 visit to UCF, the operator stated that 22.5 t out of 37 t of yellowcake had been fed into the process and that, by 14 October 2004, approximately 2 t of UF_4 had been produced. This UF_4 has not yet been verified by the Agency. However, there was no indication, as of the Agency's last visit there, that UF_6 had been produced during this campaign. The fluorine production building was visited by the Agency during this visit as well, during which it was confirmed that five of ten cells for fluorine production had been installed, of which one was ready for operation and four would soon be ready for operation.

136. As of July 2004, construction of the heavy water research reactor, IR-40, had not commenced. However, the Agency has received no communication from Iran specifically addressing the Board's request that Iran reconsider its decision to start construction of such a facility.

137. In accordance with Iran's invitation in its letter of 14 November 2004, the Agency will make arrangements to begin verification of Iran's suspension as of 22 November 2004.

138. The Director General will continue to report to the Board as appropriate.

ANNEX 1

LIST OF LOCATIONS RELEVANT TO THE IMPLEMENTATION OF SAFEGUARDS IN IRAN

LOCATION	AS OF NOVEMBER 2004	STATUS
TEHRAN NUCLEAR RESEARCH CENTRE	Tehran Research Reactor (TRR)	Operating
	Molybdenum, Iodine and Xenon Radioisotope Production Facility (MIX Facility)	Constructed, but not operating
	*Jabr Ibn Hayan Multipurpose Laboratories (JHL)	Operating
	*Waste Handling Facility (WHF)	Operating
TEHRAN	*Kalaye Electric Company	Dismantled pilot enrichment facility; being converted to centrifuge enrichment R&D
BUSHEHR	Bushehr Nuclear Power Plant (BNPP)	Under construction
ESFAHAN NUCLEAR TECHNOLOGY CENTRE	Miniaturized Neutron Source Reactor (MNSR)	Operating
	Light Water Sub-Critical Reactor (LWSCR)	Operating
	Heavy Water Zero Power Reactor (HWZPR)	Operating
	Fuel Fabrication Laboratory (FFL)	Operating
	Uranium Chemistry Laboratory (UCL)	Closed down
	Uranium Conversion Facility (UCF)	Hot testing/commissioning stage
	Graphite Sub-Critical Reactor (GSCR)	Decommissioned
	*Fuel Manufacturing Plant (FMP)	In detailed design stage, construction to begin in 2004
	*Zirconium Production Plant (ZPP)	Under construction
NATANZ	*Pilot Fuel Enrichment Plant (PFEP)	Operational; currently suspended
	*Fuel Enrichment Plant (FEP)	Under construction, currently suspended
KARAJ	*Radioactive Waste Storage	Partially operating

LASHKAR AB'AD	*Pilot Uranium Laser Enrichment Plant	Dismantled
ARAK	*Iran Nuclear Research Reactor (IR-40)	In detailed design phase
	*Hot cell facility for production of radioisotopes	Declared as no longer being under consideration
	*Heavy Water Production Plant (HWPP)	Under construction
ANARAK	*Waste storage site	Waste to be transferred to JHL

* Declared in 2003

ANNEX 2

ABBREVIATIONS AND TERMS

AEOI	Atomic Energy Organization of Iran
AUC	ammonium uranyl carbonate
AVLIS	atomic vapour laser isotope separation
BNPP	Bushehr Nuclear Power Plant, Bushehr
CSL	Comprehensive Separation Laboratory, TNRC and Lashkar Ab'ad
CVL	copper vapour laser
DIV	design information verification
ENTC	Esfahan Nuclear Technology Centre
FEP	Fuel Enrichment Plant, Natanz
FFL	Fuel Fabrication Laboratory, ENTC
FMP	Fuel Manufacturing Plant, ENTC
g	gram
GSCR	Graphite Sub-Critical Reactor, ENTC
HEU	high enriched uranium
HWPP	Heavy Water Production Plant, Arak
HWZPR	Heavy Water Zero Power Reactor, ENTC
ICR	inventory change report
IR-40	Iran Nuclear Research Reactor, Arak
JHL	Jabr Ibn Hayan Multipurpose Laboratories, TNRC
kg	kilogram
LEU	low enriched uranium
LSL	Laser Separation Laboratory, TNRC and Lashkar Ab'ad
LWR	light water reactor
LWSCR	Light Water Sub-Critical Reactor, ENTC
mg	milligram
MIX	molybdenum, iodine and xenon
MLIS	molecular laser isotope separation
MNSR	Miniaturized Neutron Source Reactor, ENTC

NRCAM	Nuclear Research Centre for Agriculture and Medicine, Karaj
PFEP	Pilot Fuel Enrichment Plant, Natanz
PHRC	Physics Research Centre
RTG	radioisotope thermoelectric generator
SWU	separative work units
t	metric ton; tonne
TBq	terabecquerel
TNRC	Tehran Nuclear Research Centre
TRR	Tehran Research Reactor, Tehran
UCF	Uranium Conversion Facility, ENTC
UCL	Uranium Chemistry Laboratory, ENTC
UF_4	uranium tetrafluoride
UF_6	uranium hexafluoride
UO_2	uranium dioxide
UO_3	uranium trioxide
U_3O_8	urano-uranic oxide
UOC	uranium ore concentrate
ZPP	Zirconium Production Plant, Esfahan

IAEA
International Atomic Energy Agency

Board of Governors

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Item 8(d) of the provisional agenda
(GOV/2004/51)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Report by the Director General

1. At its meeting in June 2004, the Board of Governors considered the report submitted by the Director General on the implementation of the Agreement between the Islamic Republic of Iran (hereinafter referred to as Iran) and the Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (the Safeguards Agreement)[1]. That report, published as GOV/2004/34 (1 June 2004) and Corr.1 (18 June 2004), provided a chronology from March 2004, summaries of the outstanding issues, next steps and assessments, and an annex on the Agency's verification activities.

2. On 18 June 2004, the Board of Governors adopted resolution GOV/2004/49, in which it:

- acknowledged that Iranian cooperation had resulted in Agency access to all requested locations, including four workshops belonging to the Defence Industries Organisation;
- deplored, at the same time, the fact that, overall, as indicated by the Director General's written and oral reports, Iran's cooperation had not been as full, timely and proactive as it should have been, and, in particular, that Iran had postponed until mid-April visits originally scheduled for mid-March — including visits of Agency centrifuge experts to a number of locations involved in Iran's P-2 centrifuge enrichment programme — resulting in some cases in a delay in the taking of environmental samples and their analysis;
- underlined that, with the passage of time, it was becoming ever more important that Iran work proactively to enable the Agency to gain a full understanding of Iran's enrichment programme by providing all relevant information, as well as by providing prompt access to all relevant places, data and persons; and called on Iran to continue and intensify its cooperation so that the Agency may provide the international community with required assurances about Iran's nuclear activities;

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[1] INFCIRC/214

- called on Iran to take all necessary steps on an urgent basis to help resolve all outstanding questions, especially that of low enriched uranium (LEU) and high enriched uranium (HEU) contamination found at various locations in Iran, including by providing additional relevant information about the origin of the components in question and explanations about the presence of a cluster of 36% HEU particles, and also the question of the nature and scope of Iran's P-2 centrifuge programme, including by providing full documentation and explanations at the request of the Agency;
- welcomed Iran's submission of the declarations under Articles 2 and 3 of its Additional Protocol, and stressed the importance of Iran complying with the deadlines for further declarations required by Articles 2 and 3 of the Protocol, and that all such declarations should be correct and complete;
- emphasized the importance of Iran continuing to act in accordance with the provisions of the Additional Protocol to provide reassurance to the international community about the nature of Iran's nuclear programme, and urged Iran to ratify without delay its Additional Protocol;
- recalled that in previous resolutions the Board had called on Iran to suspend all enrichment related and reprocessing activities, welcomed Iran's voluntary decisions in that respect; regretted that those commitments had not been comprehensively implemented and called on Iran immediately to correct all remaining shortcomings, and to remove the existing variance in relation to the Agency's understanding of the scope of Iran's decisions regarding suspension, including by refraining from the production of UF_6 and from all production of centrifuge components, as well as to enable the Agency to verify fully the suspension;
- in the context of Iran's voluntary decisions to suspend all enrichment related and reprocessing activities, called on Iran, as a further confidence building measure, voluntarily to reconsider its decision to begin production testing at the Uranium Conversion Facility (UCF) and also, as an additional confidence building measure, to reconsider its decision to start construction of a research reactor moderated by heavy water, as the reversal of those decisions would make it easier for Iran to restore international confidence undermined by past reports of undeclared nuclear activities in Iran;
- recalled that the full and prompt cooperation with the Agency of all third countries was essential in the clarification of certain outstanding questions, notably contamination;
- commended the Director General and the Secretariat for their professional and impartial efforts to implement Iran's Safeguards Agreement, and, pending its entry into force, Iran's Additional Protocol, as well as to verify Iran's suspension of enrichment related and reprocessing activities, and to investigate supply routes and sources;
- decided to remain seized of the matter.

3. In resolution GOV/2004/49, the Board also requested the Director General to report well in advance of the September Board — or earlier if appropriate — on the above issues as well as on the implementation of this and prior resolutions on Iran. The present report is the sixth in a series of written reports addressing the implementation of safeguards in Iran[1], and provides the Board with an update of developments since the Director General's last report in June 2004.

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[1] The initial report to the Board of Governors on this specific matter was provided by the Director General orally at the Board's meeting on 17 March 2003. The Director General subsequently submitted five written reports to the Board: GOV/2003/40, dated 6 June 2003; GOV/2003/63, dated 26 August 2003; GOV/2003/75, dated 10 November 2003; GOV/2004/11, dated 24 February 2004; and GOV/2004/34 dated 1 June 2004 and Corr.1 dated 18 June 2004.

A. Chronology from June 2004

4. From 29 May to 3 June 2004, Agency inspectors visited a number of workshops in Iran to establish a baseline for monitoring the suspension of production of centrifuge components, held discussions on the P-2 centrifuge programme and visited a workshop where P-2 composite rotor cylinders had been manufactured.

5. During a mission to Iran which took place from 22 to 30 June 2004, the Agency: conducted inspections at the Pilot Fuel Enrichment Plant (PFEP) at Natanz, and at the Uranium Conversion Facility (UCF); carried out complementary access at the Esfahan Nuclear Technology Centre (ENTC); and conducted design information verification at the Fuel Enrichment Plant (FEP) at Natanz and at the Molybdenum, Iodine and Xenon Radioisotope Production (MIX) Facility at the Tehran Nuclear Research Centre (TNRC).

6. On 22 June 2004, during the same mission, the Agency requested access to the Lavisan-Shian site in Tehran which had been referred to in the June 2004 Board of Governors meeting as having been relevant to alleged nuclear activities in Iran before the site was razed after November 2003. The Agency visited the site on 28 June 2004.

7. On 23 June 2004, the Agency received from Iran a letter of the same date stating that Iran "plan[ned] to suspend implementation of the expanded voluntary measures conveyed in [its] Note dated 24 February 2004", and that Iran "thus, intend[ed] to resume, under IAEA supervision, manufacturing of centrifuge components and assembly and testing of centrifuges as of 29 June 2004." In the letter, Iran requested the Agency to "take steps necessary to enable resumption of such operation as of 29 June 2004."

8. On 25 June 2004, the Director General wrote to Iran, referring to its letter of 23 June 2004, and expressing the hope that Iran would "continue to build international confidence through implementing its voluntary decisions to suspend all enrichment related and reprocessing activities" and informing Iran that the Agency would be in contact to clarify the practical implications of the decision of the Iranian authorities. Both letters were circulated to the Board of Governors for information under cover of a Note dated 25 June 2004.

9. On 29 June 2004, the Agency received from Iran a letter dated 27 June 2004 in which, referring to its own letter of 23 June 2003, Iran provided a list of seals which "[have] to be removed from material, components and equipment related to the restart of manufacturing, assembling and testing of gas centrifuge machines." In that letter, Iran also requested the Agency's response regarding "removal of the seals either by the Agency inspectors…or by the operator…" In a letter dated 29 June 2004, the Agency acknowledged receipt of Iran's letter and agreed to the removal of the seals by the operator in the absence of Agency inspectors.

10. From 30 June to 2 July 2004, the Agency met in Vienna with an Iranian delegation to discuss outstanding safeguards implementation issues. At the close of the meeting, Iran and the Agency agreed on actions to be taken in July and August 2004 to achieve progress on the resolution of those issues.

11. As agreed during that meeting, in a letter dated 2 July 2004, the Agency provided Iran with comments on the initial declarations submitted by Iran on 15 June 2004 pursuant to Articles 2 and 3 of the Additional Protocol. On 2 July 2004, the Agency also forwarded to Iran for its comments information that it had acquired through open sources on some dual-use equipment and materials, and associated locations, that could also be used for non-peaceful nuclear applications.

12. As also agreed during the meeting of 30 June to 2 July 2004, on 5 July 2004, the Agency provided Iran with a list of questions in relation to its centrifuge enrichment programme and asked that the answers be provided in writing by 20 July 2004.

13. During a visit of Agency inspectors to Iran from 6 to 18 July 2004, an Agency team met with Iranian officials to discuss the Agency's comments on Iran's Additional Protocol declarations. The team also visited Natanz to recover nuclear material left over in equipment and piping that had been used in the centrifuge research and development (R&D) programme at the Kalaye Electric Company workshop.

14. During that visit, Iran also returned to the Agency 40 seals which it had removed from equipment and centrifuge components located at Natanz, Pars Trash and Farayand Technique (see para. 9 above). The Agency team also held discussions with Iranian officials on outstanding uranium conversion issues. In addition, the team visited the waste disposal site located at Qom, and performed complementary access at Lashkar Ab'ad, at a uranium production plant located near Bandar Abbas, and at TNRC.

15. On 19 July 2004, the Agency received a letter from Iran dated 15 July 2004 concerning the source of contamination of the room under the roof of the Tehran Research Reactor (TRR). In the letter, Iran provided new information concerning the source of the material involved in the contamination.

16. From 25 July to 2 August 2004, Agency inspectors carried out inspection activities at TRR and PFEP, and at facilities on the Esfahan site, where complementary access was also carried out. At Natanz, the inspectors also visited the administrative building and the centrifuge rotor storage building in connection with the monitoring of Iran's suspension of enrichment related activities.

17. From 3 to 8 August 2004, an Agency team, led by the Director of the Division of Safeguards Operations B (DIR-SGOB), met with Iranian officials in Tehran to discuss the outstanding safeguards implementation issues identified at the meeting of 30 June to 2 July 2004. At the opening of the meeting, Iran provided the Agency with written answers to some of the questions that the Agency had previously sent to Iran. These answers were discussed in detail during the meeting.

18. At the close of the meeting, Iran agreed to complete its written answers and to provide additional documentation to the Agency. On 8 August 2004, Iran provided the Agency with more information and documentation. Following a preliminary review of that information and documentation, the Agency wrote to Iran on 16 August 2004 to request information that remained outstanding.

19. On 16 August 2004, the Agency received a letter from Iran dated 14 August 2004 stating that the operator of UCF was "intending to perform hot test to be started on 19 August 2004."

20. Between 21 and 25 August 2004, discussions at TNRC were held, and complementary access at Karaj and inspections and design information verification at PFEP and UCF were carried out.

21. Between 19 and 30 August 2004, the Agency received from Iran a number of communications forwarding additional information relevant to the outstanding issues as discussed during the 3–8 August 2004 meeting in Iran and responding to the Agency's letter of 16 August 2004.

B. Outstanding Issues and Assessments

Centrifuge programme

22. The Agency has continued to investigate the statements made by Iran regarding the chronology of its P-2 centrifuge enrichment programme (GOV/2004/34, para. 26), particularly as regards the period 1995 to 2002.

23. During the discussions which took place in August 2004, Iran repeated that, although the design drawings of a P-2 centrifuge had been acquired in 1995, no work on P-2 centrifuges was carried out until early 2002 when, according to Iran, the Atomic Energy Organization of Iran (AEOI) management decided that "work on a modified P-2 machine based on a sub-critical rotor design would not hurt," and, in March 2002, a contract to study the mechanical properties of the P-2 centrifuge was signed with a small private company. Iran stated that no feasibility or other preliminary studies or experiments were conducted by Iran during the period between 1995 and 2002.

24. Iranian officials also stated that, in spite of frequent contacts between 1995 and 1999 on P-1 centrifuge issues with the intermediaries (who, according to Iran, had provided both the P-1 and P-2 drawings), the topic of P-2 centrifuges was not addressed at all in those meetings nor in the course of making any other foreign contacts. Iran attributed this to the fact that a decision had been made to concentrate on the P-1 centrifuge enrichment programme, and that, in addition, the AEOI was undergoing senior management and organizational changes during that period of time.

25. During the 3–8 August 2004 meeting, and subsequently, the Agency received from Iran more details on the manufacturing and mechanical testing of the modified P-2 composite rotors under the contract with the private company during the period 2002–2003. The Agency reiterated its previous requests for further information from Iran on the procurement of magnets for the P-2 centrifuges, in particular on the source of all such magnets, with a view to facilitating completion by the Agency of its assessment of the P-2 experiments said to have been carried out by the private company. In a letter dated 30 August 2004, Iran informed the Agency that it was "trying to receive that information which would then be transmitted to the Agency".

26. In connection with the Agency's overall assessment of Iran's P-2 centrifuge enrichment programme, the reasons given by Iran for the apparent gap between 1995 and 2002 do not provide sufficient assurance that there were no related activities carried out during that period. The Agency is continuing its investigations of the supply network. Information in this regard will be essential for confirming the statements made by Iran with regard to the acquisition of detailed P-2 manufacturing drawings in 1995, and for understanding the subsequent developments in connection with Iran's P-2 centrifuge enrichment programme. The investigations into the supply network will also provide an opportunity for the Agency to confirm the accuracy of the information provided by Iran on its P-1 centrifuge enrichment programme.

Origin of contamination

27. Iran has continued to maintain that the LEU and HEU particles found at Natanz, the Kalaye Electric Company workshop, Farayand Technique and, more recently, at Pars Trash, are due to contamination originating from imported P-1 centrifuge components. However, a number of unanswered questions remain:

- why, if the contamination of the domestically manufactured centrifuge components was due solely to contamination from the imported components, the domestic components showed predominantly LEU contamination, while the imported components showed both LEU and HEU contamination.

- why, if the source of contamination is the same (imported components), the contamination at PFEP differed from that found at the Kalaye Electric Company workshop and Farayand Technique.
- why 36% uranium-235 (U-235) particles were found mainly in three of the locations where the imported components were located, and not at others, and why, at the Kalaye Electric Company workshop, there was a relatively large number of particles of 36% U-235 compared to the number of particles of U-235 with other enrichment levels.

28. For the Agency to be able to resolve the issue of LEU and HEU contamination, more information is needed on the locations where the imported components were manufactured and where they were subsequently used or moved to in transit to Iran (i.e. all locations where contamination of the components might have occurred).

29. While Iran provided some information in October 2003 on intermediaries involved, it continues to maintain that it does not know the origin of the components. During the 3–8 August 2004 meetings, the Agency again discussed this matter with Iran and reiterated its request that Iran make every effort possible to identify the origin of the components and the locations outside of Iran that Iranian officials had visited in the 1990s in connection with centrifuge related issues. Subsequently, Iran provided some additional information on one of those locations.

30. The Agency has also continued its discussions with the State from which most of the contaminated centrifuge components originated. The State has provided the Agency with new information on the results of its investigations into the supplier, which indicate that the components imported by Iran may not all have originated from that State. However, additional work, including swipe sampling by the Agency of equipment, is required by the Agency to help it confirm the origin of the contamination from that equipment and to verify the new information. In connection with this work, information from intermediaries and/or the companies and workshops involved in the production and storage of centrifuge components (including information derived from environmental sampling) is indispensable. The Agency is pursuing this matter through contacts with other States and with companies and individuals.

31. The Agency's analysis to date has shown that most of the HEU contamination found at the Kalaye Electric Company workshop and Natanz correlates reasonably with the HEU contamination found on imported components. Given this analysis, other correlations and model enrichment calculations based on the enrichment process in a possible country of origin, it appears plausible that the HEU contamination found at the Kalaye Electric Company workshop and Natanz may not have resulted from enrichment of uranium by Iran at those locations. Other explanations for this and the LEU contamination continue to be investigated by the Agency.

32. As indicated above, on 19 July 2004, the Agency received a letter from Iran reiterating its previous assertion that the source of contamination of the room under the roof of the Tehran Research Reactor building had been "UF_6 which [had] been produced through R&D conversion" (not UF_6 imported in 1991, as Iran had initially informed the Agency), but providing additional information on the source of the material which had been used as feed for that conversion. The Agency continues to regard as not technically plausible Iran's explanation that the contamination was due to a leaking bottle. However, the Agency will only be able to pursue this issue if new information becomes available.

Uranium conversion experiments

33. Between 1981 and mid 1993, small scale uranium conversion experiments were conducted by Iran at research laboratories at ENTC and TNRC. The Agency has been reviewing the information

provided by Iran with a view to assessing Iran's declarations regarding these experiments. The Agency has concluded that Iran's statements and declarations regarding the technical scope of its work, the equipment used and the amounts of nuclear material consumed and produced are consistent with what was ascertained by the Agency as a result of its investigations.

Laser enrichment

34. The Agency has completed its review of Iran's atomic vapour laser isotope separation (AVLIS) programme and has concluded that Iran's descriptions of the levels of enrichment achieved using AVLIS at the Comprehensive Separation Laboratory (CSL) and Lashkar Ab'ad and the amounts of material used in its past activities are consistent with information available to the Agency to date. Iran has presented all known key equipment, which has been verified by the Agency. For the reasons described in the Annex to this report, however, detailed nuclear material accountancy is not possible.

35. It is the view of the Agency's AVLIS experts that, while the contract for the AVLIS facility at Lashkar Ab'ad was specifically written for the delivery of a system that could achieve 5 kg of product within the first year with enrichment levels of 3.5% to 7%, the facility as designed and reflected in the contract would, given some specific features of the equipment, have been capable of limited HEU production had the entire package of equipment been delivered. The Iranian AVLIS experts have stated that they were not aware of the significance of these features when they negotiated and contracted for the supply and delivery of the Lashkar Ab'ad AVLIS facility. They have also provided information demonstrating the very limited capabilities of the equipment delivered to Iran under this contract to produce HEU (i.e. only in gram quantities).

Plutonium separation experiments

36. As of the last report to the Board, there remained a number of questions concerning the dates and quantities of material involved in the plutonium separation experiments carried out by Iran (GOV/2004/34, Annex, paras 15–16).

37. Iran has now agreed with the Agency's estimate of the amounts of plutonium that had been produced by irradiation (milligram quantities). During the August 2004 discussions, Iran explained the reasons for the high level of americium-241 (Am-241) and the plutonium-240 (Pu-240) contamination found in samples taken from a used glove box stored at Esfahan. As noted in the previous report, there are indications that the age of the plutonium in solutions could be less than the 12–16 years declared by Iran, that is to say, that the separation activities were carried out more recently than that. The Iranian officials maintain their earlier statements regarding the age of the plutonium. The Agency is continuing to look into this matter.

Hot cells

38. In response to questions by the Agency about past efforts by Iran to procure hot cell windows and manipulators, and the specifications associated with those items, Iran informed the Agency that there had been a project for the construction of hot cells for the production of "long lived radioisotopes" but that it had been abandoned due to procurement difficulties. In August 2004, Iran presented to the Agency detailed drawings that Iran had received from a foreign company in 1977 for hot cells which were to have been constructed at Esfahan. Iran stated that it had not yet made more detailed plans for hot cells for the Iran Research Reactor (IR-40) site at Arak, but that it had used information from those drawings as the basis for specifications in its efforts to procure manipulators for hot cells intended for the production of cobalt and iridium isotopes. In a letter dated 19 August 2004 Iran reiterated its previous statement that the hot cell project at Arak consisted of nine hot cells — four for the

"production of radioisotopes", two for the production of cobalt and iridium[3], and three for "waste management processing" — and would require ten back-up manipulators.

39. The Agency will continue to follow up on this issue with a view to achieving a better understanding of Iran's plans with respect to hot cells.

Additional Protocol

40. The Agency is reviewing the initial declarations submitted by Iran pursuant to its Additional Protocol on 21 May 2004, as well as the clarifications and supplementary information provided by Iran following the detailed discussions in July and August 2004 between the Agency and Iran.

Investigation of supply routes and sources

41. As requested by the Board in resolution GOV/2004/21, the Agency is continuing to pursue its investigation of the supply routes and sources of conversion and enrichment technology and the sources of related equipment and nuclear and non-nuclear materials. The Director General will provide more information to the Board about the results of this investigation upon its completion.

Transparency visits and discussions

42. The Lavisan-Shian site in Tehran was referred to in the June 2004 meeting of the Board of Governors in connection with alleged nuclear related activities and the possibility of a concealment effort through the removal of the buildings from that site.

43. As indicated above, in response to an Agency request, Iran provided access to that site. Iran also provided access to two whole body counters, and to a trailer declared to have been previously located on that site and to have contained one of the whole body counters. The Agency took environmental samples at these locations. Iran also gave the Agency a description and chronology of activities carried out at the Lavisan-Shian site. According to Iran, a Physics Research Centre had been established at that site in 1989, the purpose of which had been "preparedness to combat and neutralization of casualties due to nuclear attacks and accidents (nuclear defence) and also support and provide scientific advice and services to the Ministry of Defence." Iran provided a list of the eleven activities conducted at the Centre, but, referring to security concerns, declined to provide a list of the equipment used at the Centre. Iran stated further that "no nuclear material declarable in accordance with the Agency's safeguard[s] was present" and that "no nuclear material and nuclear activities related to fuel cycle [were] carried out in Lavisan-Shian."

44. According to Iran, the site had been razed in response to a decision ordering the return of the site to the Municipality of Tehran in connection with a dispute between the Municipality and the Ministry of Defence. Iran recently provided documentation to support this explanation.

45. The documentation provided by Iran is currently being assessed, and the environmental samples are being analysed.

46. In accordance with Agency practice in connection with its evaluation of other States' nuclear programmes, the Agency has discussed with the Iranian authorities open source information relating to dual use equipment and materials which have applications in the conventional military area and in the civilian sphere as well as in the nuclear military area. The Agency welcomes Iran's willingness to discuss these topics.

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[3] Cobalt-60 and iridium-192 have half-lives of 5.2 years and 74 days, respectively.

Suspension

47. In its Note Verbale of 29 December 2003, Iran informed the Agency that, with immediate effect, it would suspend:

- the operation and/or testing of any centrifuges at PFEP at Natanz;
- further introduction of nuclear material into any centrifuges;
- installation of new centrifuges at PFEP and installation of centrifuges at FEP.

48. Iran also indicated that it would withdraw nuclear material from any centrifuge enrichment facility if and to the extent practicable. It further stated that:

- it currently was not constructing any type of gas centrifuge enrichment facility at any location in Iran other than the facility at Natanz, nor did it have plans to construct new facilities capable of isotopic separation during the suspension;
- it had dismantled its laser enrichment projects and removed all related equipment;
- it was not constructing or operating any plutonium separation facility;
- during the period of suspension, it did not intend to make new contracts for the manufacture of centrifuge machines and their components;
- the Agency could fully supervise storage of all centrifuge machines assembled during the suspension period;
- Iran did not intend to import centrifuge machines or their components, or feed material for enrichment processes, during the suspension period; and
- there was no production of feed material for enrichment processes in Iran.

49. On 24 February 2004, Iran invited the Agency to verify its further voluntary decisions to:

- suspend the assembly and testing of centrifuges, and
- suspend the domestic manufacture of centrifuge components, including those related to the existing contracts, to the furthest extent possible (and said that any components that were manufactured under existing contracts that could not be suspended would be stored and placed under Agency seal).

50. Iran also confirmed that the suspension of enrichment activities applied to all facilities in Iran.

51. On 21 May 2004, Iran informed the Agency that it had not, at any time, made any undertaking not to produce feed material for the enrichment process, and that its voluntary and temporary suspension did not include suspension of the production of UF_6.

52. As previously indicated in the Director General's report to the Board (GOV/2004/34, para. 42; Annex, paras 60–61), Iran informed the Agency that it was conducting hot tests at UCF that would generate UF_6 product. One such test, which generated about 30–35 kg UF_6, was conducted between May and June 2004. Another larger test involving 37 tonnes of yellowcake is planned for August/September 2004.

53. As indicated above, Iran notified the Agency on 23 June 2004 of its intention to resume, "under IAEA supervision, manufacturing of centrifuge components and assembly and testing of centrifuges". Following this, the seals that had been used by the Agency as one of the measures for monitoring Iran's suspension of the manufacture, assembly and testing of centrifuge components at Natanz, Pars

TRash and Farayand Technique were removed by Iran and returned to the Agency during its visit to Iran between 6 and 18 July 2004. As of mid-August 2004, about 70 rotors had been newly assembled and tested, and were shown to the Agency. The Agency is discussing with Iran the necessary arrangements for the Agency to exercise "supervision". In that regard, the Agency has proposed that it seal the tested rotors, a measure which Iran has not to date accepted. It must be noted that, in the absence of such seals, the Agency's supervision of the activities identified by Iran cannot be considered effective.

54. Since the last report of the Director General to the Board of Governors, the Agency has been able to verify that there has been no operation or testing of any centrifuges at PFEP, that there has been no further introduction of nuclear material into any centrifuges at PFEP; that there has been no installation of new centrifuges at PFEP or installation of centrifuges at FEP, and that there has been no reprocessing at the Jabr Ibn Hayan Multipurpose Laboratories (JHL).

55. The Agency has also been able to reconfirm that it has not observed to date at TNRC, Lashkar Ab'ad, Arak, the Kalaye Electric Company workshop, Natanz or UCF any activities inconsistent with the Agency's understanding of Iran's current suspension undertakings.

C. Findings and Next Steps

56. The Agency welcomes the new information provided recently by Iran in response to the Agency's requests, although the process of providing information needs, in certain instances, to be accelerated. In some cases, such as Iran's clarifications related to its initial declarations pursuant to its Additional Protocol, the provision of new information has been prompt. In other cases, sufficiently detailed information has, despite repeated requests, been provided so late that it has not been possible to include an assessment of its sufficiency and correctness in this report. The Agency also welcomes the cooperation by Iran in providing access to locations in response to Agency requests, including at the Lavisan-Shian site.

57. Although the Agency is not yet in a position to draw definitive conclusions concerning the correctness and completeness of Iran's declarations related to all aspects of its nuclear programme, it continues to make steady progress in understanding the programme. In this regard, the Agency's investigations have reached a point where, with respect to two aspects previously identified by the Agency as requiring investigation (i.e. Iran's declared laser enrichment activities and Iran's declared uranium conversion experiments), further follow-up will be carried out as a routine safeguards implementation matter.

58. Two issues remain key to understanding the extent and nature of Iran's enrichment programme:

- The first issue relates to the origin of uranium contamination found at various locations in Iran. As stated above, some progress has been made towards ascertaining the source of the HEU contamination found at the Kalaye Electric Company workshop and Natanz. From the Agency's analysis to date, it appears plausible that the HEU contamination found at those locations may not have resulted from enrichment of uranium by Iran at the Kalaye Electric Company workshop or at Natanz. However, the Agency will continue to pursue the identification of sources and reasons for such contamination. The Agency will also continue with its efforts to understand the source of the LEU contamination found in various locations in Iran, including on domestically manufactured components.

- The second issue relates to the extent of Iran's efforts to import, manufacture and use centrifuges of both the P-1 and P-2 design. While the Agency has gained a better understanding of Iran's efforts relevant to both designs, additional work by the Agency will be necessary, inter alia, to confirm Iran's statements regarding the absence of P-2 centrifuge related activities in Iran between 1995 and 2002 and regarding P-2 centrifuge procurement related activities.

59. There are other issues that will also require further follow-up, for example the timeframe of Iran's plutonium separation experiments.

60. The Agency has been able to verify Iran's suspension of enrichment related activities at specific facilities and sites, and has been able to confirm that it has not observed, to date, any activities at those locations inconsistent with its understanding of Iran's current suspension undertakings.

61. It is important for Iran to support the Agency's efforts to gain a full understanding of all remaining issues by continuing to provide access to locations, personnel and information relevant to safeguards implementation in response to Agency requests — as well as by proactively providing any additional information that could enhance the Agency's understanding of Iran's nuclear programme.

62. The Agency welcomes the cooperation of other States in response to Agency requests, which is key to the Agency's ability to resolve some of the outstanding issues. Information received to date from other States has proven useful in understanding aspects of the uranium contamination found in Iran. The Agency will continue to request States to actively assist the Agency in resolving these issues.

63. The Director General will report to the Board as appropriate and not later than the November 2004 meeting of the Board.

Verification Activities

A. Uranium Conversion – Experiments and Testing

1. Between 1981 and mid-1993, Iran conducted a variety of small scale uranium conversion experiments which encompassed the conversion of uranium ore concentrate (UOC) to ammonium diuranate (ADU) and UO_2, the conversion of UOC to ammonium uranyl carbonate (AUC), the conversion of uranyl nitrate (UN) directly to UO_3, the conversion of UO_2 to UF_4 through wet and dry processes and the conversion of UF_4 to UF_6. During the period 1995 to 2002, techniques to convert UF_4 to uranium metal were developed and, during the period 1997 to 2002, research and development on processes in connection with the Uranium Conversion Facility (UCF) at Esfahan was also conducted.

2. These activities, the time periods during which they were conducted, the quantities of nuclear material used and the quantities of products and wastes are summarized in the following table.

PROCESS	TIME PERIODS	DISPOSITION OF NUCLEAR MATERIAL[4]
Conversion of UOC to ADU (ENTC)	1983 to mid-1987	49.5 kg imported U_3O_8 used to produce 36 kg ADU
Conversion of ADU to UO_2 (ENTC)	Early 1985 to mid-1987	34 kg of the 36 kg ADU used to produce 28 kg of UO_2; 2 kg ADU unused 12 kg of the 28 kg UO_2 used in subsequent experiments, 16 kg UO_2 unused Total of 6.7 kg U as liquid waste from UOC–ADU and ADU–UO_2 conversion disposed of at Qom
Conversion of UOC to AUC (ENTC)	1986 to mid-1987	About 5.5 kg imported UOC used to produce about 7 kg AUC
Conversion of UOC to AUC (TNRC)	1989 to end 1992	About 2.7 kg imported UOC used to produce about 4.5 kg AUC
Wet process production of UF_4 (TNRC)	1990 to mid-1991	12.8 kg imported UOC used to produce 10 kg UF_4; waste disposed of at Qom

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[4] For the sake of simplicity, natural and depleted uranium have been combined.

Dry process production of UF_4 (TNRC)	End 1991 to early 1992	About 2.7 kg imported UO_2 used to produce about 3 kg UF_4; 2.5 kg UF_4 remains on inventory; 0.5 kg waste disposed of at Qom
Conversion of UF_4 to UF_6 (TNRC)	Mid-1991 to mid-1993	9.8 kg imported UF_4 used to produce 6.9 kg UF_6; 2.7 kg U disposed of as waste
Conversion of UN to UO_3 (TNRC)	Second half 1992	2.2 kg imported UOC used to produce 0.3 kg UO_3; waste disposed of at Qom
Pulse column experiments (TNRC)	Early 1997 to early 2002	22.5 kg UO_2 used for various experiments, out of which equivalent of 8.6 kg UO_2 remains as liquid waste; equivalent of 14 kg UO_2 disposed of as waste at Qom
Conversion of UF_4 to uranium metal (TNRC)	1995 to early 2002	358.7 kg UF_4 (mainly imported) used to produce 126.4 kg uranium metal; 3 kg uranium metal recovered from waste

3. With the exception of the studies on uranium metal conversion and pulse columns, the small scale conversion activities started in the early to mid-1980s and continued for several years. The last of these, the UF_4–UF_6 experiments, ended in June of 1993. There are inherent difficulties with investigating activities which ended over a decade ago, and it is not possible to verify in detail the chronologies and descriptions of the experiments which took place in Iran. Therefore, the Agency's activities have been focused on assessing the consistency of information provided by Iran and examining remaining equipment and nuclear material.

4. Very detailed documentation was provided for some of the conversion experiments and tests, for example, the UO_2–UF_4, UF_4–UF_6, UN–UO_3 and uranium metal activities. Less detailed documentation was provided for the older activities, such as those associated with the UOC–ADU, ADU–UO_2 and UOC–AUC activities. The documentation was supplemented by technical meetings with scientific staff involved with and responsible for these activities. Except for the equipment associated with the UOC–AUC experiments, equipment used during the experiments was examined and, where possible, compared with documentation. Inventory examination and verification activities, including the recovery of nuclear material hold-up from the equipment, were performed to confirm, where possible, the quantities of nuclear material used, produced and lost as waste.

5. An issue of concern since the outset of the investigation of the small scale conversion activities has been the very small quantities of nuclear material used and produced relative to the size, quality and capacity of the equipment involved, particularly in connection with the UOC–ADU, ADU–UO_2, UO_2–UF_4 and the UF_4–UF_6 projects. The large scale experimental equipment, if used for full scale production, could consume and produce far in excess of what was declared to have been consumed and produced during the declared life of these activities.

6. A related issue is the use of the equipment during the period between when the activities were said to have ceased (1991–1993) and April 1999, when the equipment is said to have been dismantled and put into storage. Iran has stated that the equipment was kept in storage until January 2004, when it was examined by the Agency and the nuclear material hold-up recovered therefrom, and the equipment was destroyed at the initiative of the Iranian authorities.

7. Examination of the equipment prior to and during its destruction showed that the equipment was in very good condition and appeared to have been little used, which is consistent with the declared scale of its use.

B. Irradiation and Reprocessing Experiments

B.1. Plutonium separation

8. As described in the Director General's report to the March 2004 Board meeting (GOV/2004/11, para. 21), Iran had irradiated depleted UO_2 targets and reprocessed them on the site of TNRC. According to Iran, 6.9 kg of UO_2 had been irradiated, 3 kg of which were subsequently reprocessed to separate plutonium, and the remaining 3.9 kg had been buried in containers at the site.

9. However, on the basis of information available to it, the Agency concluded (GOV/2004/34, para. 36; Annex, paras 15-16) that the amount of plutonium declared by Iran had been understated (quantities in the milligram range rather than the microgram range as stated by Iran); that the plutonium samples taken from a glove box said to have been involved had plutonium-240 abundance higher than that found in the plutonium solution bottles presented; that the age of the plutonium solution in the bottles appeared to be less than the declared 12–16 years; and that there was an excess amount of americium-241 in samples.

10. With regard to the quantity of plutonium in solution, a recalculation by Iran based on corrected irradiation data and using a corrected equation indicated a quantity of plutonium in the range of that estimated by the Agency. During the meeting in Iran on 16 May 2004, Iran acknowledged that its theoretical estimations of the produced plutonium had been understated and accepted the Agency's estimate as being correct.

11. The age of the plutonium solutions was discussed during the meetings that took place between 3 and 8 August 2004. The Agency explained in detail the methodology it had used for dating the plutonium that had been separated, and the additional on-going work to validate the results. The Iranian officials reiterated their previous statement that the experiments had been completed in 1993 and that no plutonium had been separated since then. The Agency agreed to analyse the available data further.

12. Iran also stated that plutonium with higher Pu-240 abundance originated from work carried out between 1982 and 1984 at the Radiochemistry Laboratory of the TNRC to produce smoke detectors using Am-241. This, in Iran's view, not only explained the Pu-240 contaminant, but also the high Am-241 content in the samples. Iran stated that the Am-241 had been imported from abroad prior to the Iranian revolution in 1979, and explained that, in 1990, the glove box that had been used in connection with the Am-241 was transferred to the building where plutonium separation took place, but that it had been used for training purposes and not for plutonium experiments. According to Iran, that glove box, along with others, was moved in 2000 to a warehouse at ENTC.

13. The overall assessment with respect to the plutonium experiments is pending finalization of the results of the plutonium dating.

B.2. Polonium-210 (Po-210) production

14. The Agency has continued to follow up the explanations given by Iran on the purposes of the irradiation of bismuth metal samples that took place in TRR between 1989 and 1993 (GOV/2004/34, Annex, paras 17–19). Iran has reiterated its statement that when the project "Po-210 production by Bismuth irradiation in NRC Reactor" was approved by the Nuclear Research Centre (NRC) (later renamed the Tehran Nuclear Research Centre) in 1988, the researcher, in his project proposal, had only referred to a potential application of radioisotope batteries.

15. The Agency had previously requested further documentary information to support Iran's claims that the purpose of the project was to study the production of Po-210 on a laboratory scale only, and that there were no other clearly defined objectives or other projects that dealt with the application of Po-210. The Agency had also requested to see the original of the project proposal. Iran stated that the original documentation could not be found, but provided a statement by the Director of NRC certifying that the copy provided to the Agency, as well as the copy of the letter of approval by the former Directors of NRC also provided to the Agency, were "correct and accurate and authentic."

16. Iran subsequently reiterated in writing that it "does not have project for neither production of Po-210 nor production of neutron sources, using Po-210" and that "there [had] not been in the past any studies or projects on the production of neutron sources using Po-210". The Agency is still assessing the information provided by Iran.

C. Uranium Enrichment

C.1. Gas centrifuge enrichment

17. As described in GOV/2004/34 (Annex, para. 21), Iran has acknowledged that 1.9 kg of UF_6 contained in two small cylinders received from abroad in 1991 had been used to test centrifuges at the Kalaye Electric Company workshop. During a visit to Natanz on 10–11 July 2004, Agency inspectors, with the cooperation of Iran, recovered about 650 g of uranium from the dismantled equipment from the Kalaye Electric Company workshop. The recovered material is currently being analysed.

18. In late May 2004, the Agency visited the workshop where Iran states the composite rotor cylinders for the modified P-2 design had been manufactured. The Agency concluded that the cylinders had in fact been manufactured at the workshop, and that only very limited technical capability exists there. In late May/early June 2004, further discussions were held with the owner of the private company that had received a contract from the AEOI to investigate the P-2 design. The detailed discussions covered the chronology of events that took place between 1995, when Iran says the P-2 centrifuge drawings were received from intermediaries, and 2002, when the contract was signed, including the work carried out by the private company and any development work.

19. During the 3–8 August 2004 meeting, and subsequently, the Agency received from Iran more details on the manufacturing and mechanical testing of the modified P-2 composite rotors under the contract with the private company during the period 2002–2003. The Agency reiterated its previous requests for further information from Iran on the procurement of magnets for the P-2 centrifuges, in particular, on the source of all such magnets, with a view to facilitating completion by the Agency of its assessment of the P-2 experiments said to have been carried out by the private company. In a letter dated 30 August 2004, Iran informed the Agency that it was "trying to receive that information which would then be transmitted to the Agency."

20. On 8 August 2004, the Agency received a written communication from Iran outlining in more detail key dates of the P-2 related work. More detail was also provided about the enquiries made by the contractor concerning potential procurements from abroad.

21. The reasons given by Iran for the apparent gap between 1995 and 2002 do not provide sufficient assurance that there were no related activities carried out during that period, given that Iran had acquired a full set of drawings in 1995, and given that the owner of the private company was able to make the modifications necessary for the composite cylinders within a short period after early 2002 when, according to Iran, he had seen the drawings for the first time. The Agency is attempting to verify this information, inter alia, through the network of suppliers.

C.1.1. Origin of contamination

22. As described in GOV/2004/34 (Annex, paras 25–31), environmental samples taken by the Agency at Natanz and at the Kalaye Electric Company workshop (and, more recently, Pars Trash) revealed particles of natural uranium, LEU and HEU that called into question the completeness of Iran's declarations about its centrifuge enrichment activities. The following unanswered questions remained to be resolved:

- Analysis of samples taken from domestically manufactured centrifuge components showed predominantly LEU contamination, while analysis of samples from imported components showed both LEU and HEU contamination. It is still not clear why the components would have different types of contamination if, as Iran states, the presence of uranium on domestically manufactured components is due solely to contamination originating from imported components.

- The types of uranium contamination found at the Kalaye Electric Company workshop and at Farayand Technique differ from those at PFEP at Natanz, even though Iran has stated that the source of contamination in both cases is the imported P-1 centrifuge components.

- Environmental samples showing the presence of uranium particles enriched to 36% U-235 were found mainly in one room in the Kalaye Electric Company workshop and on the balancing machines which had been relocated from the Kalaye Electric Company workshop to Farayand Technique, both of which locations seemed to be contaminated by more than trace quantities of that material. Samples were also taken at the centrifuge assembly workshop at Natanz where Iran stated that the balancing machines had been located between February and November 2003.

23. Another distinct particle cluster of about 54% U-235, with U-236 contamination, was identified in samples taken from the surfaces of imported centrifuge components, which tends to support Iran's assertion that the source of that contamination had been imported components. However, further assessment is required to understand why 54% particles were also found in a sample collected from the chemical traps of the PFEP, which had not yet commenced operation at the time the sample was taken.

24. Since the issuance of the last report to the Board, the Agency and the State from which most of the imported P-1 centrifuges originated have, in a cooperative effort, continued to share their respective analytical results. The results provided by the State indicate that not all HEU found in the samples taken in Iran may have originated in that State. However, additional work, including swipe sampling by the Agency of equipment at appropriate locations, is required by the Agency to help it confirm the origin of the contamination from that equipment and to verify this new information. The Agency has also been in contact with a third State with a view to facilitating the resolution of the contamination questions.

25. In April 2004, the Agency was able to visit two locations in Tehran which Iran declared as also having been involved in the centrifuge R&D programme and where mechanical testing of centrifuge rotors was said to have been carried out. In the course of these visits, environmental samples were taken which also indicated the presence of HEU particles in the tested rotors for the P-1 centrifuge programme. Iran states that the R&D involved the use of imported P-1 centrifuge components and that they were likely to have been the source of the contamination. This matter was discussed again with the Iranian authorities in August 2004, and additional samples were taken from those components.

26. Iran maintains its assertion that it has not enriched uranium to more than 1.2% U-235 using centrifuge technology, and that it has not had and does not have any HEU.

27. The Agency's analysis to date has shown that most of the HEU contamination found at the Kalaye Electric Company workshop and Natanz correlates reasonably with the HEU contamination found on imported components. Given this analysis, other correlations and model enrichment calculations based on the enrichment process in a possible country of origin, it appears plausible that the HEU contamination found at the Kalaye Electric Company workshop and Natanz may not have resulted from enrichment of uranium by Iran at those locations. Other explanations for this and the LEU contamination continue to be investigated by the Agency.

28. With regard to the outstanding question relating to UF_6 contamination in the room under the roof of the Tehran Research Reactor (TRR) building (see GOV/2004/34, para. 30; Annex, paras 21–23; GOV/2003/63, paras 17–19), Iran originally attributed the contamination to the leakage of small bottles of UF_6 that had been imported in 1991. Subsequently, however, Iran acknowledged that this was not the case, as that material had been used for P-1 centrifuge tests at the Kalaye Electric Company workshop. In a letter dated 4 February 2004, Iran stated that "for a period of time 2S bottles of UF_6 [imported in 1991] as well as UF_6 bottles from conversion R&D programme had been stored in this storage. It is most probable that the particles, which have been found in the samples [taken by the Agency], could be the result of leakage of UF_6 bottles from R&D conversion, which have been kept in this storage from 1997 to 1998." It was understood from Iran's communication that the "conversion R&D programme" to which Iran refers in its letter of 4 February 2004 is the conversion between 1991 and 1993 of UF_4 which had been imported in 1991 to UF_6, as referred to in GOV/2003/75 (Annex 1, Table 1 and para. 23).

29. On 19 July 2004, the Agency received a letter from Iran dated 15 July 2004, in which Iran reiterated the statement it made in its 4 February 2004 letter that the source of contamination of the room under the roof of the Tehran Research Reactor building had been "UF_6 which [had] been produced through R&D conversion", but confirmed the Agency's understanding about the source of the material which had been used as feed for that conversion process. During the Agency's August 2004 visit, the team re-visited the room. Based on all information presently available to the Agency, its current assessment remains as stated in para. 23 of the Annex to GOV/2003/34 that the Agency continues to regard as not technically plausible Iran's explanation that the contamination was due to a leaking bottle.

C.2. Laser enrichment

30. As reported earlier (GOV/2003/75, Annex 1, para. 59), Iran in its letter dated 21 October 2003 acknowledged that, starting in the 1970s, it had had contracts related to laser enrichment using both atomic vapour laser isotope separation (AVLIS) and molecular laser isotope separation (MLIS) techniques with foreign entities from four countries:

- 1975 — a contract for the establishment of a laboratory to study the spectroscopic behaviour of uranium metal; this project had been abandoned in the 1980s as the laboratory had not functioned properly.

- Late 1970s — a contract with a second supplier to study MLIS, under which four carbon monoxide (CO) lasers and vacuum chambers were delivered, but the project had ultimately been terminated due to the political situation before major development work had begun.
- 1991 — a contract with a third supplier for the establishment of a "Laser Spectroscopy Laboratory " (LSL) and a "Comprehensive Separation Laboratory" (CSL), where uranium enrichment would be carried out on a milligram scale based on the AVLIS process. The contract also provided for the supply of 50 kg natural uranium metal.
- 1998 — a contract with a fourth supplier to obtain information related to laser enrichment, and the supply of relevant equipment. However, due to the inability of the supplier to secure export licences, only some of the equipment was delivered (to Lashkar Ab'ad).

31. In August 2004 Iran provided additional documentary evidence to support the descriptions previously provided by it with respect to its laser programme. Further discussions were held with Iranian authorities between 3 and 8 August 2004 during the meetings in Tehran.

32. With regard to the first two contracts, Iran has stated that the laser spectroscopy laboratory and the MLIS laboratory were never fully operational. These statements are supported by the information obtained by the Agency thus far from the suppliers, from the inspection of the declared equipment, from interviews with the scientists involved and from the results of environmental sampling analysis.

33. With regard to the third contract, Agency experts have reviewed a number of documents provided by Iran in May and August 2004 on the operation of the LSL and CSL prior to their dismantlement in 2000. Discussions have also been held with Iranian officials on this matter, and environmental samples taken and the results assessed. The Agency's review indicates that the equipment at the CSL operated fairly well until 1994, when foreign scientists completed their work. According to Iran, "the enrichment separation envisaged in the contract [for the CSL], and in some experiments higher enrichment were achieved in mgr" (the contract provided for "getting one milligram Uranium enriched with 3% concentration of U235 in no longer then eight hours"). As confirmed in an analysis, provided to the Agency, that had been carried out by the foreign laboratory involved in the project, the highest average enrichment achieved was 8%, but with a peak enrichment of 13%.

34. As described earlier, Iran had received 50 kg uranium metal as part of the third contract. According to the information provided to the Agency, a total of 8 kg uranium metal was used in LSL and CSL experiments. However, according to Iran, 500 g of it was evaporated in the experiments, in the course of which milligram quantities of uranium were collected. If, as declared by Iran, the evaporated uranium and collectors had been discarded with wastes, mainly at the Qom disposal site (which the Agency has visited twice), recovery of the small quantities of nuclear material involved would not be feasible and therefore accurate nuclear material accountancy is not possible.

35. According to Iran, the LSL and CSL laboratory experiments carried out between 1994 and 2000 were unsuccessful due to continuous technical problems encountered with copper vapour lasers (CVLs), electron beam guns or dye lasers. Examination by the Agency of the laboratory notebook and other supporting documents provided by Iran confirms Iran's statement that isotope separation was not successful during that period.

36. The fourth contract was for the supply of AVLIS equipment to Lashkar Ab'ad. Iran stated that, due to the inability of the supplier to secure export licences for some of the equipment (in particular, the CVLs and dye lasers, some collector parts, the electron beam gun and the power sources), only some of the equipment (including a large process vessel with supporting diffusion pumps and some diagnostics instruments), along with some training and documentation, was provided under the

contract. Iran has stated that it made attempts to procure the missing equipment, such as additional CVLs and electron beam guns, with limited success.

37. According to Iranian officials, as a consequence of these difficulties, Iran took advantage of the existing CVLs and dye lasers from CSL, and installed them in the pilot scale vessel in Lashkar Ab'ad where, in late 2002, a total of four runs with uranium feed using a total of about 500 g uranium metal were carried out. As evidence to support this statement, Iran has presented laboratory notebooks of one of the scientists involved in these activities. As described earlier, the Agency has taken environmental samples, and metal parts were taken from the chamber, with a view to determining whether enrichment levels higher than the 0.8% U-235 declared by Iran were achieved. The results of the Agency's analysis indicate enrichment levels (0.99% ± 0.24% U-235) consistent with those declared by Iran.

38. While the contract for the AVLIS facility at Lashkar Ab'ad was specifically written for the delivery of a system that could demonstrably achieve enrichment levels of 3.5% to 7%, it is the opinion of Agency experts that the system at Lashkar Ab'ad, as designed and reflected in the contract, would have been capable of HEU production had the entire package of equipment been delivered. In that connection, the experts point to the Lashkar Ab'ad AVLIS vacuum vessel, which incorporated a number of features specific to HEU separation work, including:

- an ion trap for the extraction of ion impurities for increased HEU yield; and
- a collector assembly designed for the relatively low throughput of HEU.

39. In response to the Agency's questions in connection with this assessment, Iran referred to the contract and the design parameters contained therein, which provide that the design was guaranteed by the supplier to "have actual production of at least 5 kg of a product within the first year after installation. The product will be 3.5% up to 7% enriched." Iran also provided information demonstrating the very limited capabilities of this particular equipment delivered to Iran under this contract to produce HEU (i.e. only in gram quantities). Iranian AVLIS researchers maintain that they were not aware of the significance of these features when they negotiated and contracted the supply and delivery of the Lashkar Ab'ad AVLIS facility.

D. Heavy Water Reactor Programme

D.1. Heavy Water Reactor IR-40

40. As referred to in the report of the Director General to the March 2004 Board meeting (GOV/2004/11, para. 56), Iran has provided preliminary design information on the IR-40, which is to be constructed at Arak. Iran has also provided information on the IR-40 pursuant to Articles 2.a.i. and 2.b.i. of its Additional Protocol. Iran's declarations concerning R&D activities related to the design of the heavy water reactor were further discussed in the meetings in Tehran which took place in July and August 2004, following upon which, Iran provided additional information. That information is being reviewed by the Agency.

D.2. Hot Cells

41. In response to questioning by the Agency about past efforts by Iran to procure hot cell windows and manipulators, and the specifications associated with those items, Iran informed the Agency that

there had been a project for the construction of hot cells for the production of "long lived radioisotopes" but that it had been abandoned due to procurement difficulties. In August 2004, Iran presented to the Agency detailed drawings that Iran had received from a foreign company in 1977 for hot cells which were to have been constructed at Esfahan. Iran stated that it had not yet made more detailed plans for hot cells for the IR-40 complex at Arak, but that it had used information from those drawings as the basis for specifications in its efforts to procure manipulators for hot cells intended for the production of cobalt and iridium isotopes. In a letter dated 19 August 2004 Iran reiterated its previous statement that the hot cell project at Arak consisted of nine hot cells — four for the "production of radioisotopes", two for the production of cobalt and iridium[3], and three for "waste management processing" — and would require ten back-up manipulators. The Agency is continuing to assess the information provided by Iran.

E. Implementation of the Additional Protocol

E.1. Declarations

42. Iran has continued to act as if its Additional Protocol is in force. Following receipt of the initial declarations submitted by Iran on 21 May 2004 under the Additional Protocol, the Agency began its review of the declarations and, on 2 July 2004, provided comments to Iran on those declarations. During the early July 2004 visit of inspectors to Iran, the Agency reviewed its comments with Iran. During the Agency's August 2004 visit to Iran additional comments were provided by the Agency to Iran and a number of revisions requested, which Iran agreed to provide by mid-August 2004. Clarifications were also sought by Iran on the interpretation of some of the provisions of the Additional Protocol. The Agency and Iran intend to revisit some of the issues raised by Iran in the near future.

E.2. Complementary Access

43. Since the June 2004 Board meeting, the Agency has carried out complementary access in Iran on six occasions: at [illegible], twice at ENTC, and once each at TNRC, Lashkar Ab'ad, Karaj and the Bandar Abbas uranium mine and production plant at Gchine.

F. Transparency Visits and Discussions

44. During the June 2004 meeting of the Board of Governors, the Director General asked Iran to provide the Agency, in the interest of transparency, access to the Lavisan-Shian site. The request was prompted by a reference made during that meeting to the Lavisan-Shian site in connection with alleged nuclear related activities (including the use of whole body counters) carried out at that site and the possibility of a concealment effort by Iran to hide these activities through the removal of all of the buildings from the site after November 2003.

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[3] Cobalt 60 and iridium 192 (with half-lives of 5.3 years and 74 days, respectively).

45. On 28 June 2004, the Agency visited the Lavisan-Shian site, where it took environmental samples. Iran gave the Agency a description and chronology of activities carried out at the Lavisan-Shian site. As described by Iran in a follow up letter to the Agency dated 8 August 2004, a Physics Research Centre had been established at that site in 1989, the purpose of which had been "preparedness to combat and neutralization of casualties due to nuclear attacks and accidents (nuclear defence) and also support and provide scientific advice and services to the Ministry of Defence." Iran provided a list of the eleven activities conducted at the Physics Research Centre, but, referring to security concerns, declined to provide a list of the equipment used at the centre. In a letter to the Agency dated 19 August 2004, Iran stated further that "no nuclear material declarable in accordance with the Agency's safeguard[s] was present" and reiterated its earlier statement that "no nuclear material and nuclear activities related to fuel cycle were carried out at Lavisan-Shian."

46. During its discussions with the Agency in June 2004, Iran confirmed its acquisition from a foreign entity of two whole body counters and their installation in two trailers. Iran further confirmed that one of these whole body counters, together with its trailer, had previously been located at the Lavisan-Shian site. Between 28 and 30 June 2004, Iran provided the Agency access to two whole body counters, and to a trailer said to have contained one of the whole body counters while it was located at Lavisan-Shian. The Agency collected environmental swipe samples from the whole body counters and the trailer.

47. According to Iran, the site had been razed in response to a decision ordering the return of the site to the Municipality of Tehran in connection with a dispute between the Municipality and the Ministry of Defence. Iran recently provided documentation in support of this explanation, which is currently being assessed.

48. The environmental swipe samples from the whole body counters and the trailer, along with the vegetation, soil and swipe samples collected from the Lavisan-Shian site, are currently being analysed, and the documents provided by Iran in support of these explanations are being assessed.

49. In accordance with Agency practice in connection with its evaluation of other States' nuclear programmes, the Agency has discussed with the Iranian authorities open source information relating to dual use equipment and materials which have applications in the conventional military area and in the civilian sphere as well as in the nuclear military area.

G. Suspension of Enrichment Related and Reprocessing Activities

G.1. Scope of suspension

50. As described in the previous Board report (GOV/2004/34, Annex, para. 51), Iran informed the Agency on 29 December 2003 that:

- it would suspend the operation and/or testing of any centrifuges, either with or without nuclear material, at PFEP at Natanz;
- it would suspend further introduction of nuclear material into any centrifuges;
- it would suspend installation of new centrifuges at PFEP and installation of centrifuges at the Fuel Enrichment Plant (FEP) at Natanz; and

- it would withdraw nuclear material from any centrifuge enrichment facility if and to the extent practicable.

51. Iran stated further that it did not currently have any type of gas centrifuge enrichment facility at any location in Iran other than the facility at Natanz that it was now constructing, nor did it have plans to construct, during the suspension period, new facilities capable of isotopic separation; it had dismantled its laser enrichment projects and removed all related equipment; and it was not constructing nor operating any plutonium separation facility.

52. Iran also stated on 29 December 2003 that, during the period of suspension, Iran did not intend to make new contracts for the manufacture of centrifuge machines and their components; the Agency could fully supervise storage of all centrifuge machines assembled during the suspension period; Iran did not intend to import centrifuge machines or their components, or feed material for enrichment processes, during the suspension period; and "[t]here is no production of feed material for enrichment processes in Iran."

53. On 24 February 2004, Iran informed the Agency that instructions would be issued by the first week of March to implement the further decisions voluntarily taken by Iran to: (i) suspend the assembly and testing of centrifuges, and (ii) suspend the domestic manufacture of centrifuge components, including those related to the existing contracts, to the furthest extent possible. Iran also informed the Agency that any components that were manufactured under existing contracts that could not be suspended would be stored and placed under Agency seal. Iran invited the Agency to verify these measures. Iran also confirmed that the suspension of enrichment activities applied to all facilities in Iran.

54. On 15 March 2004, Iran notified the Agency that the Agency's verification of the suspension of centrifuge component production could begin as of 10 April 2004. However, due to disputes between the AEOI and some of its private contractors, three private companies would continue with centrifuge component production.

55. Iran stated in a letter dated 18 May 2004, received by the Agency on 21 May 2004, that "Iran has not, at any time, made any undertaking not to produce feed material for the enrichment process. The decision taken for voluntary and temporary suspension is based on clearly defined scope which does not include suspension of production of UF_6."

56. On 23 June 2004, the Director General received a letter from Iran informing him that Iran "plan[ned] to suspend implementation of the expanded voluntary measures conveyed in [its] Note dated 24 February 2004" and that Iran "thus, intend[ed] to resume, under IAEA supervision, manufacturing of centrifuge components and assembly and testing of centrifuges as of 29 June 2004." In the letter, Iran requested the Agency "to take steps that may be necessary to enable resumption of such operations as of 29 June." On 25 June 2004, the Director General wrote to Iran, referring to its letter of 23 June 2004, and expressed the hope that Iran would "continue to build international confidence through implementing its voluntary decisions to suspend all enrichment related and reprocessing activities" and informing Iran that the Agency would be in contact to clarify the practical implications of the decision of the Iranian authorities. Both letters were circulated to the Members of the Board of Governors for their information under cover of a Note dated 25 June 2004.

57. On 29 June 2004, the Agency received a letter forwarding a list of seals which, as foreseen in its letter of 23 June 2004, would be removed from material, components and equipment related to centrifuge component manufacturing and assembling. In a letter dated 29 June 2004, the Agency acknowledged receipt of Iran's letter and agreed to the removal of the seals by the operator in the absence of Agency inspectors.

G.2. Monitoring activities

58. The status of the Agency's monitoring activities as of May 2004 was provided in the Director General's previous report to the Board of Governors (GOV/2004/34, Annex, paras 56–68). The Agency has continued its monthly monitoring activities at PFEP, most recently on 21–22 August 2004, to ensure that the suspension of enrichment activities at PFEP is fully implemented. The surveillance records from the cascade hall have been reviewed to ensure that no additional centrifuge machines were installed; the seals on equipment and nuclear material were verified to ensure that they had not been tampered with and replaced. The cascade hall continues to be under Agency surveillance and all the previously declared UF_6 feed material remains under Agency seal. Other activities conducted by the Agency in connection with the monitoring of Iran's suspension undertakings have included:

- design information verification at FEP;
- monitoring of the decommissioned status of the AVLIS pilot plant at Lashkar Ab'ad through complementary access; and
- inspections at JHL.

59. During the Agency's June 2004 visit to Esfahan, the operator of UCF stated that, of the 143 kg of UF_4 produced and verified by the Agency previously, 60 kg had been fed into the UF_6 process line. About 25 to 30 kg of UF_6 produced from those activities was being kept in two condensers and another 5 kg of UF_6 had been stored in a container. The operator told Agency inspectors that the equipment testing had been completed and that another larger test involving 37 tonnes of yellowcake is planned for August/September 2004.

60. Following on this, the seals that had been used by the Agency as one of the measures for monitoring Iran's suspension of the manufacture, assembly and testing of centrifuge components at Natanz, Pars Trash and Farayand Technique were removed by Iran and returned to the Agency during its visit to Iran between 6 and 18 July 2004. As of mid-August 2004, about 70 rotors had been newly assembled and tested, and were shown to the Agency. The Agency is discussing with Iran the necessary arrangements for the Agency to exercise "supervision". In that regard, the Agency has proposed that it seal the tested rotors, a measure which Iran has not to date accepted. It must be noted that, in the absence of such seals, the Agency's supervision of the activities identified by Iran cannot be considered effective.

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Board of Governors

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Item 8(e) of the agenda
(GOV/2004/45)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Corrigendum

Replace the last sentence of paragraph 47 with the following: "However, important information about the P-2 centrifuge programme has frequently required repeated requests, and in some cases has been incomplete, and continues to lack the necessary clarity."

IAEA
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Board of Governors

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Item 8(e) of the provisional agenda
(GOV/2004/27)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Report by the Director General

1. At its meeting in March 2004, the Board of Governors considered the report submitted by the Director General on the implementation of the Agreement between the Islamic Republic of Iran (hereinafter referred to as Iran) and the Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (the Safeguards Agreement)[1]. That report, published as GOV/2004/11 (24 February 2004), provided a chronology from November 2003, a summary of the Agency's verification activities and its current assessment, and next steps.[2]

2. On 13 March 2004, the Board of Governors adopted resolution GOV/2004/21, in which it:

- Recognized that the Director General reported Iran to have been actively cooperating with the Agency in providing access to locations requested by the Agency, but, as Iran's cooperation so far had fallen short of what was required, called upon Iran to continue and intensify its cooperation, in particular through the prompt and proactive provision of detailed and accurate information on every aspect of Iran's past and present nuclear activities;
- Welcomed Iran's signature of an Additional Protocol to its Safeguards Agreement; urged its prompt ratification; underlined the Board's understanding that, in its communication to the Director General of 10 November 2003, Iran had voluntarily committed itself to acting in accordance with the provisions of the Protocol with effect from that date; and stressed the importance of Iran complying with the deadline for declarations envisaged in Article 3 of the Protocol;

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[1] INFCIRC/214.

[2] The initial report to the Board of Governors on this specific matter was provided by the Director General orally at the Board's meeting on 17 March 2003. The Director General subsequently submitted four written reports to the Board: GOV/2003/40, dated 6 June 2003; GOV/2003/63, dated 26 August 2003; GOV/2003/75, dated 10 November 2003; and GOV/2004/11, dated 24 February 2004.

- Recalled that in its resolutions of 12 September 2003[1] and 26 November 2003 the Board had called on Iran to suspend all enrichment-related and reprocessing activities; noted that Iran's voluntary decisions of 29 December 2003 and 24 February 2004 constituted useful steps in this respect; called on Iran to extend the application of this commitment to all such activities throughout Iran; and requested the Director General to verify the full implementation of these steps;

- Deplored that Iran, as detailed in the report by the Director General, had omitted any reference, in its letter of 21 October 2003 which was to have provided the "full scope of Iranian nuclear activities" and a "complete centrifuge R&D chronology", to its possession of P-2 centrifuge design drawings and to associated research, manufacturing, and mechanical testing activities, which the Director General had described as "a matter of serious concern, particularly in view of the importance and sensitivity of those activities";

- Echoed the concern expressed by the Director General over the issue of the purpose of Iran's activities related to experiments on the production and intended use of polonium-210, in the absence of information to support Iran's statements in this regard;

- Called on Iran to be proactive in taking all necessary steps on an urgent basis to resolve all outstanding issues, including the issue of low enriched uranium (LEU) and high enriched uranium (HEU) contamination at the Kalaye Electric Company workshop and Natanz, the issue of the nature and scope of Iran's laser isotope enrichment research and the issue of the experiments on the production of polonium-210;

- Noted with appreciation that the Agency was investigating the supply routes and sources of technology and related equipment and nuclear and non-nuclear materials found in Iran; reiterated that the urgent, full and close cooperation with the Agency of all third countries was essential in the clarification of outstanding questions concerning Iran's nuclear programme, including the acquisition of nuclear technology from foreign sources; and appreciated any cooperation in this regard as may already have been extended to the Agency;

- Decided to defer until its June meeting, and after receipt of the next report of the Director General, consideration of progress in verifying Iran's declarations, and of how to respond to the above-mentioned omissions; and

- Decided to remain seized of the matter.

3. In resolution GOV/2004/21, the Board also requested the Director General to report on the above issues before the end of May, as well as on the implementation of this and prior resolutions on Iran, for consideration by the June Board of Governors, or to report earlier if appropriate. This report, which presents a chronology from March 2004, outstanding issues and next steps and a summary of the Agency's current assessment, along with an Annex on the Agency's verification activities, is being submitted in response to that request.

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[1] GOV/2003/69, GOV/2003/81

A. Chronology from March 2004

4. On 3 March 2004, the Agency notified Iran of its intention to carry out an inspection at the Pilot Fuel Enrichment Plant (PFEP) at Natanz, visits to other locations in Iran and discussions on Iran's nuclear programme between 13 and 18 March 2004. On 12 March 2004, Iran replied to the Agency's notification, stating that, "due to the practical reasons such as unavailability of personnel needed to be available for the inspection during the proposed schedule, which is the last week prior to Iranian New Year, the inspection had to be postponed until the second half of April 2004". The Agency replied on that day asking Iran urgently to reconsider the postponement of the inspection and visits.

5. On 5 March 2004, the Agency received a Note Verbale from Iran attaching "Comments and Explanatory Notes by [Iran] on the Report of the IAEA Director General (GOV/2004/11)" which, at the request of Iran, was circulated by the Secretariat as INFCIRC/628 (5 March 2004). On 30 March 2004, the Secretariat issued a response to those comments and explanatory notes in document 2004/Note 17.

6. On 15 March 2004, the Agency received from Iran a Note Verbale stating that "instruction has been issued to implement the voluntary decisions adopted by [Iran] on 24 February 2004[4] and planning for the implementation of that instruction has been started", but that, due to fact that "we are approaching the Iranian New Year holidays, ... verification of the suspension of those measures can begin on 10 April 2004". Iran also informed the Agency that the inspection at PFEP could be conducted on 29 March 2004. The inspection was carried out on that date.

7. On 6 April 2004, the Director General and senior Agency officials met in Tehran with H.E. Mr. M. Khatami, the President of Iran; H.E. Mr. R. Aghazadeh, Vice President of Iran and President of the Atomic Energy Organization of Iran (AEOI); H.E. Dr. H. Rohani, Secretary of the Supreme National Security Council of Iran; and H.E. Mr. K. Kharrazi, Minister of Foreign Affairs of Iran, to discuss safeguards implementation issues. During these discussions, the Iranian authorities agreed to accelerate cooperation with the Agency on a number of outstanding matters identified by the Director General with a view to achieving progress on the resolution of such issues prior to the June 2004 meeting of the Board of Governors.

8. The visits originally scheduled for mid-March 2004, including the discussions related to Iran's nuclear programme, were eventually held between 12 and 23 April 2004. The mission also included a visit by Agency centrifuge technology experts to a number of locations involved in Iran's P-2 centrifuge enrichment activities. They also visited a number of privately owned workshops in order to verify the suspension of centrifuge assembly and domestic production of centrifuge components at those locations. Since, at the time, no agreement could be reached on the modalities for access to the centrifuge component production workshops on sites belonging to the Defence Industries Organization (DIO), the Agency did not to carry out any verification activities at those locations.

9. On 15 April 2004, the Deputy Director General for Safeguards (DDG-SG) met in Vienna with Mr. Zamaninia, Director General of the Foreign Ministry of Iran, to further discuss modalities of Agency access to the sites owned by DIO. However, no agreement was reached at that time.

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[4] As indicated in paragraph 62 of GOV/2004/11, on 24 February 2004, Iran informed the Agency that instructions would be issued by the first week of March to implement the further decisions voluntarily taken by Iran to (i) suspend the assembly and testing of centrifuges, and (ii) suspend the domestic manufacture of centrifuge components, including those related to the existing contracts, to the furthest extent possible.

10. On 20-21 April 2004 the Agency met with an Iranian delegation, led by H.E. Mr. C. Nasseri, a special adviser to the Government of Iran, to discuss issues referred to in the Director General's 6 April 2004 meeting in Iran, including modalities for access to the DIO sites.

11. Between 24 April and 5 May 2004, the Agency carried out inspections at the Tehran Research Reactor (TRR), the Jabr Ibn Hayan Multipurpose Laboratories (JHL), the Uranium Conversion Facility (UCF) and the Fuel Fabrication Laboratory (FFL). In addition to the inspections, discussions were held on Iran's earlier uranium conversion experiments.

12. On 26 April 2004, the Agency informed Iran of the Agency's requirements for its independent verification of Iran's voluntary suspension of the domestic production of centrifuge enrichment components at the DIO sites, noting that, before such verification could take place, the Agency needed to receive confirmation that Iran would agree to the actions identified by the Agency.

13. On 27 April 2004, the Agency provided Iran with the results of analyses of environmental samples taken previously at the Tehran Nuclear Research Centre (TNRC) and the Esfahan Nuclear Technology Centre (ENTC), as well as the results of environmental samples taken in January 2004 in some of the workshops involved in the production of P-1 centrifuge components. The Agency also provided comments on the information provided by Iran on its plutonium separation experiments.

14. In a letter dated 29 April 2004, Iran informed the Agency that it intended to conduct hot tests of the UF_6 production line at UCF. On 7 May 2004, the Agency wrote to Iran, informing it that, given the amounts of nuclear material involved, the hot testing of UCF with UF_6 gas would technically amount to the production of feed material for enrichment processes. In a letter dated 18 May 2004, Iran informed the Agency that "the decision taken for voluntary and temporary suspension is based on clearly defined scope which does not include suspension of production of UF_6."

15. From 8 to 12 May 2004, Agency laser enrichment experts visited Iran with the main objective of reviewing the chronology of the laser enrichment programme and assessing the correctness and completeness of Iran's declarations with regard to this programme.

16. Between 14 and 23 May, Agency inspectors: carried out verification and sealing activities with respect to centrifuge components at Natanz in connection with the suspension; took samples associated with imported UF_6; and visited the Heavy Water Production Plant (HWPP) at Arak.

17. From 15 to 17 May 2004, pursuant to a request by Iran, the Agency sent two technical staff from the Department of Safeguards to Iran to provide clarifications on the Guidelines and Format for Preparation and Submission of Declarations pursuant to Articles 2 and 3 of the Model Protocol Additional to Safeguards Agreements.

18. On 21 May 2004, an Iranian delegation led by Mr. Nasseri met with the Agency in Vienna to discuss the status of the issues discussed with the Director General during his 6 April 2004 meeting in Tehran. As a result of this meeting, Iran and the Agency were able to reach agreement the following day on the Agency's proposal regarding the frequency of visits during the next twelve months for verifying the suspension of the production of gas centrifuge enrichment components at the nine sites declared by Iran as having been engaged in such activities.

19. On 21 May 2004, Iran submitted the initial declarations pursuant to its Additional Protocol. In the Note Verbale forwarding the declarations, Iran informed the Agency that, as Iran had signed the Additional Protocol on 18 December 2003 and had decided voluntarily to apply the Protocol "as a confidence building measure in the context of Article 17 [of the Protocol]", the declarations were being submitted "prior to the due date of 18 June 2004", following the Director General's request during this visit to Iran in April 2004. The Note Verbale also states that, in the preparation of these declarations, "within this limited time, every reasonable effort has been made to provide the Agency

with the information to the extent that [it is] relevant to and compatible with the provisions of the Protocol" and that the declarations were "open to further clarification and amplification if needed."

20. On 28 May 2004, the Director General met again with an Iranian delegation headed by Mr. Nasseri to discuss significant issues that remained outstanding.

21. On 29 May 2004, at the beginning of a five-day visit to Iran, Agency inspectors held discussions with Iranian authorities on the P-2 centrifuge programme and conducted activities related to the verification of suspension at DIO workshops and at Natanz.

B. Outstanding Issues and Next Steps

Import and fabrication of P-2 centrifuge components

22. As noted in the Director General's last report to the Board (GOV/2004/11, paras 44–45), Iranian authorities had previously stated that Iran had not obtained any P-2 centrifuges, or components thereof, from abroad, but had manufactured all components, including composite rotors, in a workshop on the premises of a private company in Tehran. Iran has now acknowledged that, contrary to these earlier statements, it had imported some magnets relevant to P-2 centrifuges from Asian suppliers, and that the composite rotors that had been manufactured in Iran had in fact been fabricated in another workshop situated on a DIO site. On 30 May 2004, Iran provided information to the Agency on the quantities and sources of imported magnets, raw materials and some related equipment. This information is currently being assessed by the Agency.

23. In response to further questions by the Agency, Iran has also stated that the private company had also made enquiries with a European intermediary about the procurement of 4000 magnets with specifications suitable for use in P-2 centrifuges, but that no magnets had actually been delivered by the intermediary to Iran. In addition, during discussions held with the Agency on 30 May 2004, the owner of the private company acknowledged that he had mentioned to the intermediary the possibility of future procurement of higher numbers of P-2 centrifuge magnets beyond the 4000. He stated that the higher numbers of magnets had been mentioned to attract the intermediary by indicating that larger orders would follow.

24. The Agency has asked for further detailed information on imports by Iran of items for P-2 centrifuges, and an explanation regarding how the procurement efforts referred to in paragraph 23 above fit with the declared small scale of Iran's P-2 centrifuge research and development (R&D) programme.

25. Environmental samples have been collected at the workshop of the private company at which the P-2 centrifuge components were said to have been manufactured and tested, the results of which are pending. The workshop where the composite rotors were manufactured was visited on 30 May 2004.

26. In light of the investment made in obtaining the design drawings of the P-2 centrifuge and the technical capabilities that existed in Iran at the time, the Agency centrifuge enrichment experts have some questions regarding Iran's statement that, although the design drawings had been acquired in 1995, no work on P-2 centrifuges was begun until 2001, and mechanical testing of the P-2 composite rotors began only in 2002. The experts also expressed doubt about the feasibility of carrying out centrifuge tests based on the P-2 designs — which required the procurement of parts from abroad and the manufacture of casings and centrifuge components — within the stated period of less than a year.

Origin of contamination

27. As mentioned in the Director General's previous reports, Iran has maintained that the LEU and HEU particles found at Natanz, the Kalaye Electric Company and Farayand Technique are due to contamination originating from imported P-1 centrifuge components. Iran has recently provided additional information on the locations in Iran to which the P-1 centrifuge equipment and components had been moved, as well as information on some associated timescales. Given the complexity of the information provided by Iran regarding domestic movements of the components, Agency experts do not anticipate that this information will contribute further to the resolution of the contamination issue, unless more information becomes available about the origin of the components. The Agency first requested in August 2003 information on the origin of the components. While Iran maintains that it does not know the origin of the equipment, it has, however, identified some of the intermediaries involved.

28. The Agency has continued discussions with the State from which it believes most of the centrifuge enrichment components originated, and with some of the intermediaries. Information obtained in these discussions may be helpful in resolving some of the contamination issues. However, although additional information has been requested and sampling will be needed to verify that information, it is unlikely, based on the information currently available, that the Agency will be able to conclude that the 36% uranium-235 (U-235) contamination found at Kalaye and Farayand was due to components originating from the State in question. Other possible explanations for this contamination remain under study by the Agency, including through contacts with other States.

29. The Agency is also analysing the recently available results of additional swipe samples in an effort to resolve the questions as to why the contamination is different on domestic and imported centrifuges, and why the contamination at PFEP at Natanz is different from that found at the Kalaye Electric Company workshop and Farayand Technique.

30. The Agency has also requested further information from Iran regarding the UF_6 contamination in the building at TRR at TNRC.

Design of UCF

31. As noted in the GOV/2004/11 (para. 14), Iran had stated that UCF was built on the basis of a detailed set of drawings and other design documentation obtained from a foreign source in the early 1990s. To assess the validity of this statement, Agency experts compared these documents with the as-built components of UCF. The experts have concluded that the documents presented in general constitute the basis for the UCF design, with two exceptions: the uranium ore concentrate purification process and the uranium metal production process. The AEOI had not in these instances used the design documentation, but rather had used processes developed and tested at TNRC.

Uranium conversion experiments

32. Agency experts continued efforts to confirm Iran's declaration that there had not been, in addition to laboratory experiments, any pilot scale uranium conversion experiments. In support of this declaration, Iran has completed characterization of all nuclear material at JHL and submitted revised nuclear material accountancy reports to the Agency. However, the Agency has requested additional supporting information from contemporaneous records of experiments, which would help to corroborate Iran's statements regarding the amounts of nuclear material produced and disposed of as waste. Final assessment of this issue is also pending additional sample analysis.

AVLIS capabilities

33. Iran had previously stated that the production capability of the atomic vapour laser isotope separation (AVLIS) equipment used at the Comprehensive Separation Laboratory (CSL) in the 1990s was on the order of a few milligrams per day, and that the equipment was able to enrich uranium up to the contracted level of 3% U-235, and even slightly beyond (GOV/2003/75, para. 59). With Iran's cooperation, the Agency's laser enrichment experts have been able to confirm Iran's statement regarding production capability. However, during the Agency experts' visit in May 2004, Iran presented laboratory reports indicating that the average laser enrichment levels achieved in these small quantities had been 8% to 9%, with some samples of up to approximately 15%. These laboratory reports are currently being assessed in more detail.

34. Agency experts have concluded that the capacity of the AVLIS installation at Lashkar Ab'ad was about 1 gram per hour, but that it was not able to operate continuously. With the cooperation of Iran, the Agency was able to remove from Iran some internal parts of equipment, which will be analysed with a view to assessing the AVLIS-related statements made by Iran in its 21 October 2003 declaration.

Designs for hot cells at IR-40

35. As discussed in the Director General's previous reports (GOV/2004/11, para. 57; GOV/2003/75, paras 73–75), the Agency has raised questions regarding the absence of hot cell designs in drawings submitted for the Iran Nuclear Research Reactor (IR-40). In its 13 May 2004 submission of updated design information for the IR-40, Iran stated that, due to difficulties associated with obtaining technical information and subsequent purchase of manipulators and shielding windows, the construction of hot cells for "long lived" radioisotopes was no longer under consideration.

Plutonium separation experiments

36. With regard to the plutonium separation experiments, the Agency has concluded that Iran understated the plutonium produced. However, the amounts produced were only in the milligram range. The Agency also found that the age of the plutonium in solutions was less than the 12–16 years declared. The Iranian officials maintain the earlier statements regarding age, but have agreed to repeat their analysis. The Agency also found some irradiated natural uranium in some samples, which the facility operator has attributed to iodine-131 (I-131) production experiments which had been declared to the Agency in 2003. The final assessment of this issue is pending.

Provision of requested corrections and revised design information

37. As requested by the Agency, Iran has submitted revised design information with respect to certain facilities. Iran has also provided corrections with respect to inventory change reports, material balance reports and physical inventory listings, as requested by the Agency. However, as mentioned in the Director General's report to the March meeting of the Board (GOV/2004/11, para. 71), some corrections are still pending due in part to the need to establish the amount of nuclear material in dismantled equipment at Natanz.

Additional Protocol

38. The Agency is reviewing the initial Additional Protocol declarations submitted by Iran on 21 May 2004.

Investigation of supply routes and sources

39. As requested by the Board in resolution GOV/2004/21, the Agency is continuing to pursue its investigation of the supply routes and sources of conversion and enrichment technology and related equipment and nuclear and non-nuclear materials, and has received cooperation in that regard from a number of Member States. The Director General will provide more information to the Board about the results of this investigation as appropriate.

Suspension

40. The Agency has continued to carry out verification activities with respect to the suspension of enrichment and reprocessing related activities at TNRC, Lashkar Ab'ad, Arak, Kalaye Electric Company workshop, Natanz and UCF, and has not observed to date any activities at those locations inconsistent with Iran's voluntary undertaking. Iran has also stated that it suspended the production of centrifuge components as from 9 April 2004. The Agency has been able to confirm this at three workshops, but three workshops belonging to private companies have continued production, claiming that they have not received adequate compensation from the AEOI for the suspension or termination of contracts. In addition, as of 21 May 2004, the Agency had not visited three DIO workshops, because the modalities of access to those locations had yet to be agreed by Iran. Agreement has now been reached with Iran on these modalities, and the three DIO workshops are to be visited during the week of 31 May 2004. As of the date of this report, two of the three sites have been visited.

41. It should be noted that some of the activities subject to suspension, such as component production, are inherently difficult to verify, and the assurances that the Agency can provide for the purpose of confidence building are of a different nature from those achievable with respect to the detection of nuclear material diversion. Therefore, while more intensive verification of the declared locations is possible, a balance should be struck between the cost and benefit of such verification.

42. Iran has informed the Agency that it is currently conducting hot tests at the UCF that will generate UF_6 product in the near future. Iran has stated that its voluntary suspension of enrichment activities does not include the suspension of UF_6 production.

C. Assessments

43. There has been good progress on the actions agreed during the Director General's visit to Tehran in early April 2004. The Agency welcomes Iran's recent provision of the initial declarations pursuant to its Additional Protocol. Iran has been cooperating with the Agency in providing access to locations in response to Agency requests, including workshops situated at military sites. This is welcome, as is Iran's agreement to provide one-year multiple-entry visas to designated Agency inspectors.

44. The Agency has been able to verify Iran's implementation of its decision to suspend enrichment related and reprocessing activities. However, this verification was delayed in some cases by the discussion of modalities for access to the DIO sites, and is not yet comprehensive because of the continued production of centrifuge equipment by some private companies. Iran's decision to proceed with the generation of UF_6 at UCF through the conduct of hot tests is at variance with the Agency's previous understanding as to the scope of Iran's decision regarding suspension.

45. The Agency continues to make progress in gaining a comprehensive understanding of Iran's nuclear programme, but a number of issues remain outstanding. Two issues, in particular, are key to understanding the extent and nature of Iran's previously undeclared enrichment programme:

46. The first such issue relates to the origin of HEU and LEU contamination found at various locations in Iran. As stated in paragraph 27 above, the information provided to date by Iran has not been adequate to resolve this complex matter and Iran should make every effort to provide any additional information about the origin of the components that could be useful in resolving outstanding questions. The Agency has received some information from other States that may be helpful in resolving some contamination questions, and will equally continue to request those States to make every effort to assist the Agency in resolving this matter.

47. The second issue is the extent of Iran's efforts to import, manufacture and use centrifuges of both the P-1 and the P-2 design. The Agency has gained a fuller understanding of the scale of the programme involving P-1 centrifuges, and the locations of their use. However, important information about the P-2 centrifuge programme has frequently required repeated requests, and in some cases continues to involve changing or contradictory information.

48. It is important that Iran work proactively to enable the Agency to gain a full understanding of Iran's enrichment programme by providing all relevant information, as well as by providing prompt access to all relevant sites. Iran's postponement until mid-April of the visits originally scheduled for mid-March — including visits of Agency centrifuge experts to a number of locations involved in Iran's P-2 centrifuge enrichment programme — resulted in a delay in the taking of environmental samples and their analysis. It is also important that all other States with relevant information promptly provide such information to the Agency. Bringing the two issues referred to in paragraphs 46 and 47 above to a close, after almost two years from when Iran's undeclared programme came to the Agency's knowledge, is of key importance to the Agency's ability to provide the international community with the required assurances about Iran's nuclear activities.

49. The Director General will report to the September 2004 meeting of the Board, or earlier, as appropriate.

VERIFICATION ACTIVITIES

A. Uranium Conversion

A.1. The Uranium Conversion Facility

1. Since the issuance of the Director General's report in March 2004, the Agency has been able to carry out a complete design information verification (DIV) at UCF. In the course of this activity in April 2004, Iran informed the Agency that the UF_6 production line of UCF would be ready for hot testing within a few weeks.

2. As indicated in the Director General's previous report (GOV/2004/11, para. 14), based on a preliminary examination of the UCF drawings and technical reports, Agency experts on conversion had reached a preliminary conclusion that it appeared that UCF was being built essentially on the basis of those drawings and reports, as had previously been declared by Iran. However, as also indicated in GOV/2004/11, further comparison of the documents with the as-built components of UCF was necessary to confirm this conclusion.

3. Between 24 April and 5 May 2004, during the visit by the Agency's conversion experts, the Agency carried out a detailed review of a selection of the documents said to have been provided in the early 1990s to Iran by a foreign supplier. The purpose of this review was to further assess the validity of Iran's statement that the UCF plant had been built essentially on the basis of that documentation, and not on the basis of pilot scale testing. The Agency was able to compare directly what was found in the documents with the actual installation and operations.

4. Based on its examination of the documents and the installed units, the Agency experts concluded that the documents were the technical basis for the design of the UCF, with two exceptions: the uranium ore concentrate (UOC) purification process and the uranium metal production process.

5. The basis for the change to the purification process from mixer settlers to pulse columns was clarified during discussions with engineering staff and through the examination of small scale test equipment at TNRC. As described by Iranian officials, initial tests had been carried out using glass column equipment followed later by the use of a small metal column system. According to these officials, following these tests, a full scale pulse column was constructed and cold tested at TNRC. It was stated that this pulse column is now installed in UCF. As regards the uranium metal production process, the Agency experts have noted that the process described in the foreign documents was technically and mechanically complex and more difficult than the process that Iran had successfully tested at TNRC. In light of this, the experts considered as credible Iran's explanation that it had therefore opted to use its own techniques at UCF.

6. On 15 March 2004, Iran informed the Agency that hot tests of the UOC purification process at UCF had been started that day. This process involves the conversion of UOC into ammonium uranyl tricarbonate (AUTC) through purification and precipitation. On 29 March 2004, the Agency was informed by Iran that operational tests of the conversion of the AUTC first into UO_2 and then into UF_4 would begin within the next few days. The final product of that process is UF_4 suitable for fluorination to UF_6. In a letter dated 29 April 2004, Iran informed the Agency that, following the successful hot tests mentioned above, hot tests of the UF_6 production line would begin on 6 May 2004.

7. On 1 May 2004, Iran confirmed to the Agency its intention to carry out the hot tests and stated that Iran considered such activities to be tests, and not as production of UF_6. On 7 May 2004, the Agency wrote to Iran, informing it that, given the amounts of nuclear material involved (which, with the current inventory of UF_4, would be in the order of 100 kg), the hot testing of UCF with UF_6 gas would technically amount to the production of feed material for enrichment processes (see also paragraphs 60–61 below on suspension). As of 21 May 2004, Iran had not yet started the UF_6 production hot tests.

8. The Agency has verified the inventory of uranium ore concentrate at UCF, the quantities of UF_4 and intermediate uranium compounds, and the waste that had been produced since the commissioning of the UOC to UF_4 conversion line. The Agency is currently assessing the results of its verification.

9. Iran has agreed to follow the Agency's revised policy for natural uranium conversion plants, which will permit more effective safeguards implementation at such facilities.

A.2. Experiments and testing

10. During the April/May 2004 mission of the Agency uranium conversion experts, additional discussions were held on Iran's conversion experiments and tests, as previously described by Iran (see GOV/2004/11, para. 16), with a view to confirming Iran's declaration concerning these activities. The Agency considers that contemporaneous records of experiments (e.g. log books and note books) would help corroborate Iran's statements regarding the amounts of nuclear material that were produced and sent for disposal as waste.

11. The operator of JHL completed the characterization and declaration of all nuclear material at JHL so that the flow chart on nuclear material involved in the conversion experiments could be completed. All inventory change reports were corrected and have been submitted to the Agency. Apart from the impurities analysis, which is still under evaluation, the results of the Agency verification agree with the activity levels and quantities of nuclear material declared by Iran to the Agency.

12. At JHL, Agency inspectors also discussed in greater detail with the Iranian authorities Iran's production of uranium metal for its AVLIS experiments. The Agency was able to take samples from the uranium metal, the analysis results of which are pending.

B. Irradiation and Reprocessing Experiments

B.1. Plutonium separation

13. As described in the Director General's report to the March 2004 meeting of the Board (GOV/2004, para. 21), Iran had irradiated depleted UO_2 targets and reprocessed some of them in shielded glove boxes. According to Iran, 7 kg of UO_2 were irradiated, 3 kg of which were subsequently reprocessed for the separation of plutonium, and the remaining 4 kg buried in containers on the site of TNRC. Iran estimated that the original amount of plutonium in the solution was approximately 200 µg. Based on Agency calculations the amount of plutonium should have been higher.

14. As indicated in the previous report, the glove boxes and equipment, as well as the separated plutonium, were presented to the Agency for sample taking in November and December 2003. Since

the last report, the analytical results have become available, and Iran provided the Agency with additional information on the experiments along with detailed records of the successful experiments.

15. On the basis of the information available to it, the Agency has concluded that the amount of plutonium declared by Iran had been understated. However, the amounts produced were only in the milligram range. The Agency also concluded that the analytical results indicated sources of plutonium other than that identified in the solution bottles, specifically: some of the plutonium has a plutonium-240 (Pu-240) abundance different from that found in the plutonium solution bottles; the age of the plutonium in the solution bottles appears to be less than the declared 12–16 years; analyses revealed the possible presence of slightly irradiated natural uranium; and the presence of milligram quantities of plutonium appears to be inconsistent with the relatively large amounts of unexplained separated americium-241 (Am-241) found in the glove box. These findings were discussed with Iran.

16. The Iranian officials acknowledged that their theoretical estimations of the produced plutonium had been low. However, they maintained that the 200 µg of declared separated plutonium was the actual amount successfully separated, and that the extremely low yield was due to very low separation efficiency. The Iranian officials provided corrected data sheets on the irradiation and reprocessing experiments that addressed the presence of one of the plutonium sources. As regards the age of the plutonium, the Iranian officials reiterated their statement that the experiments had been completed in 1993, and agreed to repeat the analysis of the plutonium solution samples in an attempt to obtain more precise results. They also suggested that the slightly irradiated natural uranium may be present due to I-131 production experiments (declared to the Agency in 2003) in which such material had been used. Finally, in response to the Agency's observations, the Iranian officials described work that had been carried out in the glove box involving separated Am-241, which explains the existence of Am-241 in the glove box.

B.2. Polonium-210 production

17. The Agency also continued to follow up on explanations by Iranian officials of the purposes of the irradiation of bismuth metal samples that took place in the TRR between 1989 and 1993 (GOV/2004/11, paras 28–31). As explained in GOV/2004/11, although bismuth is not a nuclear material requiring declaration under the Safeguards Agreement, its irradiation is of interest to the Agency as it produces polonium-210 (Po-210), an intensely radioactive alpha emitting radioisotope[5] that could be used not only for certain civilian applications (such as radioisotope thermoelectric generators (RTGs), in effect, nuclear batteries[6]), but also, in conjunction with beryllium, for military purposes (specifically, as a neutron initiator in some designs of nuclear weapons).

18. In response to Agency inquiries, Iran informed the Agency in November 2003 that the bismuth irradiation had been part of a feasibility study for the production and use of Po-210 in RTGs. During subsequent discussions in February 2004, Iranian officials said that the experiments were also a part of a study about neutron sources, but that, as there were few remaining records related to the project, Iran was not able to provide evidence to support its claims as to the stated purpose. However, Iran provided the Agency with a document reflecting the approval of the project in which reference is made to these applications. In the most recent meeting on 21 May 2004, Iranian authorities continued to maintain that the purpose of the bismuth irradiation had been to produce pure Po-210 on a laboratory scale, noting that, if the production and extraction of Po-210 were successful, it could be used in radioisotope thermoelectric batteries, as was the case in the SNAP-3 application (a US developed power source for

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[5] Po-210 has a half-life of 138 days.

[6] The reported applications of Po-210 based RTGs are limited in number.

use in space probes). In the view of Agency experts, the explanations provided by Iran thus far are not detailed enough and therefore not entirely adequate.

19. It is the Agency's understanding that the submission of a proposal with appropriate justifications is standard practice as part of the approval process for such projects at TNRC. In light of that, the Agency has asked Iran to renew its efforts with a view to locating any further more detailed proposals or reports in connection with the internal approval of the Po-210 project.

20. The Agency will continue to follow up on these matters as appropriate.

C. Uranium Enrichment

C.1. Gas centrifuge enrichment

21. As of the issuance of GOV/2004/11, there were a number of issues outstanding with respect to the use and disposition of 1.9 kg of UF_6 (in two small cylinders) that had been imported by Iran in 1991 and which Iran acknowledged had been used in centrifuge tests at the Kalaye Electric Company workshop. The matters that required more follow-up included:

- Explanations for the UF_6 contamination detected under the roof of the TRR building where the material had been stored.
- Analysis of the samples taken from the dismantled equipment stored at PFEP said to contain, as hold-up, the 1.9 kg of UF_6.

22. As described in GOV/2004/11 (para. 33), Iran originally stated that the 1.9 kg of the UF_6 which appeared to be missing from the two small cylinders had not been used, but had leaked from the cylinders during their storage in the TRR building. Environmental samples taken from that storage area did indicate the presence of UF_6. Subsequently, however, Iran acknowledged that, contrary to its previous declarations, Iran had used that material in P-1 centrifuge tests at the Kalaye Electric Company workshop. Accordingly, the Agency sought further clarification as to the source of the contaminant material and its current location, as well as the date on which the contamination had taken place.

23. In a letter dated 4 February 2004, Iran indicated, for the first time, that bottles containing UF_6 from domestic R&D conversion activities had been stored in the TRR building from 1997 to 1998, and that "it is most probably that the particles which have been found in the [environmental] samples [taken by the Agency] could be the result of leakage of [these] UF_6 bottles". For a number of technical reasons, the Agency experts did not consider this explanation credible and requested further explanations. During his visit to Iran in April 2004, the Director General reiterated the Agency's request for evidence of the source of contamination. On 21 May 2004, the Iranian officials reconfirmed that the source of the contamination had been the domestically produced UF_6 contained in the bottles, and agreed to provide to the Agency without delay the date that the contamination actually occurred and a precise description of the circumstances under which it took place. The Agency has still to receive the requested information.

24. Samples still need to be taken of the nuclear material in the dismantled equipment at PFEP. However, on 17 and 18 May 2004, samples were taken from the larger cylinder containing UF_6 imported by Iran in 1991. The samples are currently being analysed and the results should be available soon.

25. As described in GOV/2004/11 (para. 39) and GOV/2003/75 (paras 34 and 35; Annex 1, paras 38–41, 45, 53), environmental samples taken by the Agency at Natanz and at the Kalaye Electric Company workshop revealed particles of natural uranium, LEU and HEU that called into question the completeness of Iran's declarations about its centrifuge enrichment activities. As of the issuance of GOV/2004/11, a number of discrepancies and unanswered questions remained to be resolved:

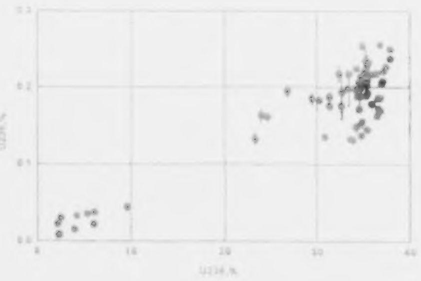
- Analysis of samples taken from domestically manufactured centrifuge components showed predominantly LEU contamination, while analysis of samples from imported components showed both LEU and HEU contamination. It is not clear why the components would have different types of contamination if, as Iran states, the presence of uranium on domestically manufactured components is due solely to contamination originating from imported components.

- The types of uranium contamination found at the Kalaye Electric Company workshop and at Farayand Technique differ from those at PFEP at Natanz, even though Iran has stated that the source of contamination in both cases is the imported P-1 centrifuge components.

- Environmental samples showing uranium enriched to 36% U-235 have come almost entirely from one room in the Kalaye Electric Company workshop and from a balancing machine at Farayand Technique that had been relocated from the Kalaye Electric Company workshop, both of which seem to be contaminated by more than trace quantities of that material.[7] Only negligible traces of 36% enriched uranium have been found on imported P-1 centrifuge components. The level of contamination suggests the presence of more than just trace quantities of such material.[8]

26. The Agency has taken additional swipe samples in an effort to resolve the first two questions, i.e. why the contamination is different on domestic and imported centrifuges, and why the contamination at Natanz is different from that found at the Kalaye Electric Company workshop and Farayand Technique. The results are now available, and the Agency is in the process of evaluating them.

27. As noted above, the presence of the 36% HEU is localized in a room of Building 3 at the Kalaye Electric Company workshop and on the vertical balancing machine at Farayand Technique. The presence of the HEU is indicated in the following graph by the large group of particles around 36% U-235. The fact that virtually no other particles similar to this group have been identified on imported centrifuge components suggests that those components are not the source of the 36% HEU, and that the 36% HEU was introduced in the room and the balancing machine in some other manner.



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[7] On 28 May 2004, Iran stated that the balancing machine had also been at Natanz from February to November 2003.

[8] 36% enriched uranium is characteristic of nuclear material used in certain research reactors outside of Iran.

28. Since the issuance of the last report to the Board, the Agency and the State from which the imported P-1 centrifuges are believed to have originated have, in a cooperative effort, shared their respective analytical results. That State has reported to the Agency that it is not plausible that all of the contamination found in Iran could have originated from their country (e.g. the U-236 fraction found in Iran is significantly higher). Although the Agency has not yet been permitted to take its own samples from equipment or material in that State, the Secretariat and the State's authorities have discussed measures which would permit independent authentication of the State's results with a view to permitting the Agency to make progress on the issue of contamination. The Agency is also consulting with another State with a view to facilitating the resolution of the contamination questions.

29. As had been requested by the Agency since August 2003, Iran provided the Agency on 4 May 2004 with additional information about the movements of imported P-1 components. This information, combined with the results from environmental sampling, is currently being assessed. However, no information has been provided by Iran about the origin of these P-1 components, which Iran maintains it does not know. In addition, although Iran had previously identified some of the intermediaries who had secured the components on behalf of Iran, no additional intermediaries have been identified.

30. Given the results of the environmental sample analysis as indicated above, Iran has been asked to provide further information, particularly in light of its declaration that it has not enriched uranium to more than 1.2% U-235 using centrifuge technology.

31. The Agency was also invited in April 2004 to visit two locations in Tehran which Iran declared as having been involved in the centrifuge R&D programme and where mechanical testing of centrifuge rotors had been carried out. In the course of these visits, environmental samples were taken, the results of which are still pending. The Agency interviewed staff and contractors of AEOI who had been involved in Iran's centrifuge enrichment programme.

32. As reported in GOV/2004/11 (paras 44-48), in January 2004 Iran acknowledged that it had received P-2 centrifuge drawings from foreign sources in 1994 and that in 2002 it had conducted some mechanical tests, without nuclear material, using domestically manufactured rotors. The Iranian authorities stated that Iran had not obtained any P-2 centrifuges, or components thereof, from abroad, and that the components Iran did have, it had produced domestically in the workshop of a private company.

33. In subsequent clarification, Iran indicated that the P-2 drawings had been received around 1995, that no actual work commenced until 2001 and that the mechanical testing of the P-2 composite rotors had begun only in 2002. In light of the investment made in obtaining the design drawings of the P-2 centrifuge and the technical capabilities that existed in Iran at the time, the Agency centrifuge enrichment experts have some questions regarding Iran's statement that, after the design drawings around 1995, no actual work commenced until 2001, and that the mechanical testing of the P-2 composite rotors had begun only in 2002. The experts expressed doubt about the feasibility of carrying out such tests — which required the procurement of parts from abroad and the manufacture of casings and centrifuge components — all within a period of less than a year. On 30 May 2004, Iran provided additional information on the chronology of the P-2 experiments, which is currently being assessed.

34. At the request of the Agency, Iran allowed the Agency access to documents said to be the original P-2 technical drawings received from foreign intermediate sources. According to Iranian authorities, Iran received no electronic copies of the P-2 drawings. Having reviewed the drawings, the Agency centrifuge experts concluded that the origin of the drawings was the same as that of the drawings provided to the Socialist People's Libyan Arab Jamahiriya.

35. Iran informed the Agency in April 2004 that it had in fact imported some components relevant to its P-2 enrichment activities. The Agency has asked for details related to the import of those components and any additional information related to their procurement and the procurement of any other relevant components.

36. On 28 May 2004, in response to this request, Iran stated that the private company in Tehran that had manufactured the P-2 components had made enquiries with a European intermediary about the procurement of 4000 magnets with specifications suitable for use in P-2 centrifuges. Iran stated that no magnets had actually been delivered by that foreign company to Iran, but that magnets relevant to P-2 centrifuges had been procured from Asian suppliers. The Agency asked for further detailed information, and an explanation regarding how such procurement efforts fit with the stated small scale of its P-2 centrifuge R&D programme. During discussions with the Agency on 30 May 2004, the owner of the private company acknowledged that he had mentioned to the intermediary the possibility of future procurement of higher numbers of P-2 centrifuge magnets beyond the 4000. He stated that the higher numbers of magnets had been mentioned to attract the intermediary by indicating that larger orders would follow. During those discussions, Iran also provided the Agency with other additional information on its procurement efforts, which is now being assessed.

37. The Agency has also reviewed the contract concluded by the AEOI with the private company referred to above for the carrying out of mechanical testing of a composite rotor for the P-2 derivative centrifuge. One of the terms of the contract was that a technical progress report was to be prepared by the contractor and submitted to the AEOI. In response to the Agency's request for access to that report, a report, written in Farsi, was shown to the Agency and an oral translation of the text provided. The document, however, was not a progress report on the achievements of the development programme, as had been requested by the Agency, but a technical report on the theory of centrifuges and the conclusions reached as a result of those theoretical studies. No details were given in that report concerning the number of centrifuges assembled and tested or the outcomes of such tests. The contractor claimed that he was still in dispute with the AEOI with respect to his payment and that he was therefore reluctant to produce the missing information.

38. This information has been discussed with Iranian officials, and further explanations have been requested.

C.2. Laser enrichment

39. As reported in GOV/2004/11 (paras 49-55), the Agency has continued its evaluation of information and verification results in connection with Iran's AVLIS programme, which it had declared to the Agency in October 2003.

40. During the April/May 2004 visit of Agency laser enrichment experts, Iran cooperated with the Agency by providing relevant information, including documentation, and allowing interviews with scientists who had been involved in laser experiments at the CSL in the 1990s. The Agency experts have concluded that the production capacity of the AVLIS equipment used in these experiments is of the order of a few milligrams of uranium a day. Although Iran had previously indicated to the Agency that it had been able to produce enrichment levels of a little more than 3%, in discussions with the Agency in early May 2004, Iranian officials stated that they had been able to achieve average enrichment levels of 8% to 9%, with some samples of up to approximately 15%. At the meeting on 21 May 2004, Iran offered the explanation that the higher enrichments arose from initial tuning experiments of the AVLIS equipment and that it was not possible for the experimenters to know or control in advance the range of enrichment of all the material. Agency experts are studying this explanation.

41. The Agency was also informed that, as part of a contract with the supplier of the equipment, some samples from the AVLIS project had been sent for analysis to the supplier's laboratory. Final assessment of the CSL experiments is pending receipt of additional information from that analytical laboratory. Although the amounts of material involved were only on a milligram scale, Iran should have included in its 21 October 2003 declaration references to the higher enrichment levels and to the shipment of samples for analysis.

42. During the April and May missions, the inspectors and laser enrichment experts also interviewed personnel who had been involved in enrichment experiments and related research and development at Lashkar Ab'ad and at the Laser Research Centre (LRC) in Tehran. Based on information provided by Iran and examination of the equipment made available at Karaj, Agency experts concluded that the capacity of the larger scale AVLIS installation at Lashkar Ab'ad was about 1 gram of uranium per hour, but that continuous operation was not possible. With the cooperation of Iran, the Agency was able to sample some internal parts of the laser equipment, including the collector plates, which have been brought to the Agency's laboratory for analysis. Chemical analysis of those will be used to confirm the statements by Iran concerning AVLIS contained in its 21 October 2004 declaration.

43. On 3 March 2004, the Agency had written to Iran seeking clarification of information related to Iran's laser enrichment programme, in particular as regarded training in, and delivery of specific equipment (excimer lasers) by, another State. During the April/May 2004 mission, the laser enrichment experts were able to access the laser equipment, which Iran had declared as having been part of R&D on fusion. The Agency experts concluded that the lasers were not suitable for use in the enrichment of uranium.

44. Iran provided the Agency with a copy of extracts from the contract related to the training abroad of Iranian officials on lasers.

45. As indicated in GOV/2003/63 (para. 42), Iran is continuing with its R&D on copper vapour lasers. In May 2004, the Agency visited the LRC, which is developing pulsed (250 nanosecond) NdYAG lasers which could be useful in Iran's AVLIS programme if the pulse width is shortened.

D. Heavy Water Reactor Programme

46. Following on the Agency's inquiry about efforts by Iran to import hot cells for use in connection with the Iran Nuclear Research Reactor (IR-40), construction of which is now scheduled to commence in June 2004, and requests for design information relevant to such hot cells, Iran stated in October 2003 that two hot cells had been foreseen for the project, but that neither the design nor detailed information about the dimensions or the actual layout of the hot cells was available. Iran later stated that it had tentative plans to construct at Arak an additional building with hot cells for the production of "long lived" radioisotopes.

47. Information provided to the Agency by another State on Iran's efforts to procure hot cell manipulators indicates that the specifications for the hot cells called for a wall thickness of approximately 1.4 metres, a dimension somewhat excessive for the stated radioisotope production and more indicative of that required for handling spent fuel.

48. In April 2004, the Agency requested updated design information for IR-40. It also reiterated its request for design information on the hot cells.

49. On 13 May 2004, the Agency received updated design information for the IR-40. Iran stated in its submission that, due to difficulties associated with obtaining technical information and subsequent purchase of manipulators and shielding windows, the construction of hot cells for "long lived" radioisotopes was no longer under consideration.

E. Suspension of Enrichment Related and Reprocessing Activities

E.1. Scope of suspension

50. As reported by the Director General to the November 2003 meeting of the Board, Iran informed him on 10 November 2003 of its decision to suspend enrichment related and reprocessing activities.

51. In its Note Verbale of 29 December 2003, Iran further informed the Agency, that, with immediate effect:

- it would suspend the operation and/or testing of any centrifuges, either with or without nuclear material, at PFEP at Natanz;
- it would suspend further introduction of nuclear material into any centrifuges;
- it would suspend installation of new centrifuges at PFEP and installation of centrifuges at the Fuel Enrichment Plant (FEP) at Natanz; and
- it would withdraw nuclear material from any centrifuge enrichment facility if and to the extent practicable.

52. In its 29 December 2003 communication, Iran also stated that: it did not currently have any type of gas centrifuge enrichment facility at any location in Iran other than the facility at Natanz that it was now constructing, nor did it have plans to construct, during the suspension period, new facilities capable of isotopic separation; it had dismantled its laser enrichment projects and removed all related equipment; and it was not constructing nor operating any plutonium separation facility.

53. In addition, Iran also stated in its 29 December 2003 communication that: during the period of suspension, Iran did not intend to make new contracts for the manufacture of centrifuge machines and their components; the Agency could fully supervise storage of all centrifuge machines assembled during the suspension period; Iran did not intend to import centrifuge machines or their components, or feed material for enrichment processes, during the suspension period; and "[t]here is no production of feed material for enrichment processes in Iran".

54. On 24 February 2004, Iran informed the Agency that instructions would be issued by the first week of March to implement the further decisions voluntarily taken by Iran to (i) suspend the assembly and testing of centrifuges, and (ii) suspend the domestic manufacture of centrifuge components, including those related to the existing contracts, to the furthest extent possible. Iran also informed the Agency that any components that were manufactured under existing contracts that could not be suspended would be stored and placed under Agency seal. Iran invited the Agency to verify these measures. Iran also confirmed that the suspension of enrichment activities applied to all facilities in Iran.

55. In its Note Verbale to the Agency of 15 March 2004, Iran stated that the Agency's verification of the suspension of centrifuge component production could begin as of 10 April 2004. However, as

stated by Iran, due to disputes between the AEOI and some of its private contractors, three private companies continued production in April. The Agency has received no further information which would suggest that these private companies have suspended their centrifuge component production activities.

E.2. Verification activities

56. The Agency's approach to verifying Iran's decision to suspend certain activities needs to be viewed in the context of a number of considerations, including the following:

- Verification is limited to those sites that have been identified by Iran. It may be of questionable value, therefore, for the Agency to invest significant time and resources in intensive verification at these sites, given that the Agency cannot provide any assurance about the possibility of component production elsewhere in the country. Therefore, the approach being adopted by the Agency for verifying the suspension of component production, as agreed with the Iranian authorities, is based primarily on visits at short notice to certain locations.
- Some of the activities subject to suspension, such as component production, are inherently difficult to verify. The assurances that the Agency can provide are of a different nature from those achievable with respect to the detection of nuclear material diversion.

57. The cascade hall of PFEP continues to be under Agency surveillance and all of the declared UF_6 feed material remains under Agency seal. All containment and surveillance devices have been checked during monthly inspections, most recently on 15 to 16 May 2004, confirming the non-operational status of the facility.

58. As a result of its verification activities, the Agency is able to confirm: that there has been no operation or testing of any centrifuges, either with or without nuclear material, at PFEP; that no new centrifuges have been installed at PFEP; that no centrifuges have been installed at FEP; and that no nuclear material has been introduced into any centrifuges which have been declared to the Agency.

59. The Agency has also, through inspections, design information verification visits and complementary access, continued to verify:

- The decommissioned status of the dismantled pilot enrichment facility at the Kalaye Electric Company workshop in Tehran. The workshop was last visited on 13 and 22 May 2004.
- The decommissioned status of the AVLIS pilot plant at Lashkar Ab'ad and of the decommissioned AVLIS and molecular laser isotope separation (MLIS) installations at TNRC, as well as the dismantled AVLIS and MLIS related equipment currently stored at Karaj. These locations were visited most recently on 10 and 11 May 2004.
- The non-production of UF_6 at UCF, and of uranium metal at UCF and TNRC. These locations were visited between 26 April and 5 May 2004.

60. As regards the last point, Iran has commenced hot tests of two units of UCF. As indicated above in paragraph 7 of this Annex, in its letter dated 7 May 2004, the Agency informed Iran that, given the amounts of nuclear material involved, the hot testing of a third UCF unit, the UF_6 production unit, with UF_6 gas would technically amount to the production of feed material for enrichment processes.

61. In a letter dated 18 May 2004, Iran stated that "the decision taken for voluntary and temporary suspension is based on clearly defined scope which does not include suspension of production of UF_6." This is at variance with the Agency's previous understanding of Iran's decision, as stated in the Director General's report to the Board meeting in November 2003 (GOV/2003/75, para. 19) and

indicated in the Director General's report to the Board meeting in March 2004 (GOV/2004/11, para. 66), as well as in the Agency's letter to Iran dated 5 December 2003, in which the Agency sought Iran's confirmation that it would proceed on the basis of an attached plan prepared by the Agency, which, inter alia, contemplated the suspension of the production of feed material for enrichment processes.

62. Iran continued to assemble P-1 centrifuge rotors until April 2004, at which time Iran announced it would cease such assembly. The total number of P-1 rotors verified by the Agency during its visit in February 2004 was 855. Since then, the operator has declared that another 285 rotors had been assembled. During its April visit, the Agency verified the total of 1140 assembled P-1 rotors.

63. During the Agency's April 2004 visit, contracts for the production of P-1 centrifuge components in Iran were reviewed. Iran has been requested to declare to the Agency the total number of such components imported and manufactured in Iran so that an inventory of the components could be established by the Agency. Most of the P-1 components locally manufactured were transferred to Natanz.

64. Iran has provided the Agency with an inventory of imported and domestically produced centrifuge components. During their visits in May 2004, Agency inspectors took an inventory of the key components and sealed them inside containers. Of the 402 assembled rotors, 392 were sealed by the Agency. Iran has requested that a small number of key components, as well as 10 assembled rotors be left unsealed in order to allow ongoing R&D centrifuge work at Kalaye Electric Company and Natanz. Iran stated that R&D is not covered by its voluntary suspension undertakings, but these unsealed items would be made available to the Agency on request to permit it to ensure that they are not used in activities inconsistent with Iran's undertaking.

65. A number of mandrels and moulds used to manufacture some of the key components were also transferred to Natanz. These items, as well as maraging steel and high strength aluminium, were placed under Agency seal on 31 May and 1 June 2004. At Natanz and Farayand Technique, vertical and horizontal balancing machines were sealed by the Agency, along with the centrifuge test pits. Engineering jigs and gauges which had been used for quality control were also sealed by the Agency at Natanz.

66. Since February 2004, the Agency visited a number of workshops declared by Iran as having been involved in the production of P-1 centrifuge components. However, as noted above, at three of the private workshops, the centrifuge component production activities have not been suspended.

67. On 22 May 2004, Iran and the Agency reached agreement on the Agency's proposal regarding the frequency of visits during the next twelve months for verifying the suspension of the production of gas centrifuge enrichment components at nine sites declared by Iran as having been engaged in such activities. As a consequence of this agreement, visits are being carried out at the three DIO sites during the week of 31 May 2004.

68. In relation to reprocessing, the Agency has continued to verify the use and construction of declared hot cells, including equipment used earlier for plutonium separation experiments at TNRC, ENTC, Karaj and Arak. In addition, the Agency has carried out inspections and design information verification at JHL in support of its verification of the suspension of reprocessing.

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Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Report by the Director General

1. At its meeting in November 2003, the Board of Governors considered the report submitted by the Director General on the implementation of the Agreement between the Islamic Republic of Iran (hereinafter referred to as Iran) and the IAEA for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (the Safeguards Agreement)[1]. The report, published in GOV/2003/75 (10 November 2003), provided a summary of the Agency's verification activities, its findings, its current assessment and next steps, and an annex providing a detailed technical chronology of the various processes involved.[2]

2. On 26 November 2003, the Board of Governors adopted resolution GOV/2003/81, in which it:

- Welcomed Iran's offer of active cooperation and openness and its positive response to the demands of the Board in the resolution adopted by the Board on 12 September 2003 (GOV/2003/69), and underlined that, in proceeding, the Board considered it essential that the declarations that had now been made by Iran amounted to the correct, complete and final picture of Iran's past and present nuclear programme, to be verified by the Agency;
- Strongly deplored Iran's past failures and breaches of its obligation to comply with the provisions of the Safeguards Agreement, as reported by the Director General, and urged Iran to adhere strictly to its obligations under its Safeguards Agreement in both letter and spirit;
- Noted the statement by the Director General that Iran had taken the specific actions deemed essential and urgent and requested of it in paragraph 4 of GOV/2003/69;

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[1] INFCIRC/214.

[2] The initial report to the Board of Governors on this specific matter was provided by the Director General orally at the Board's meeting on 17 March 2003. The Director General subsequently submitted three written reports to the Board: GOV/2003/40, dated 6 June 2003; GOV/2003/63, dated 26 August 2003; and GOV/2003/75, dated 10 November 2003.

- Requested the Director General to take all steps necessary to confirm that the information provided by Iran on its past and present nuclear activities was correct and complete, as well as to resolve such issues as remained outstanding;
- Endorsed the view of the Director General that, to achieve this, the Agency must have a particularly robust verification system in place: an Additional Protocol, coupled with a policy of full transparency and openness on the part of Iran, was indispensable;
- Reiterated that the urgent, full and close cooperation with the Agency of all third countries was essential in the clarification of outstanding questions concerning Iran's nuclear programme;
- Called on Iran to undertake and complete the taking of all necessary corrective measures on an urgent basis, to sustain full cooperation with the Agency in implementing Iran's commitment to full disclosure and unrestricted access, and thus to provide the transparency and openness that are indispensable for the Agency to complete the considerable work necessary to provide and maintain the assurances required by Member States;
- Decided that, should any further serious Iranian failures come to light, the Board would meet immediately to consider, in the light of the circumstances and of advice from the Director General, all options at its disposal, in accordance with the IAEA Statute and Iran's Safeguards Agreement;
- Noted with satisfaction the decision of Iran to conclude an Additional Protocol to its Safeguards Agreement, and re-emphasized the importance of Iran moving swiftly to ratification and also of Iran acting as if the Protocol were in force in the interim, including by making all declarations required within the required timeframe;
- Welcomed Iran's decision voluntarily to suspend all enrichment related and reprocessing activities and requested Iran to adhere to it, in a complete and verifiable manner, and endorsed the Director General's acceptance of Iran's invitation to verify implementation of that decision and report thereon; and
- Decided to remain seized of the matter.

3. In resolution GOV/2003/81, the Board also requested the Director General to submit a comprehensive report on the implementation of the resolution by mid-February 2004 for consideration by the March Board of Governors, or to report earlier if appropriate. This report is being submitted in response to that request.

A. Chronology since November 2003

4. Between 8 and 16 December 2003, the Agency carried out ad hoc inspections at the Tehran Nuclear Research Centre (TNRC) and the Natanz site, design information verification (DIV) at TNRC, Natanz and the Esfahan Nuclear Technology Centre (ENTC), and complementary access at ENTC and Karaj.

5. On 18 December 2003, the Iranian Government signed the Protocol Additional to its Safeguards Agreement.

6. In a Note Verbale dated 29 December 2003, the Iranian Government specified the scope of suspension of its enrichment and reprocessing activities that the Agency was invited to verify. On

24 February 2004, Iran informed the Agency of its decision to expand the scope of its suspension (see Section B.5.1 below).

7. On 6 January 2004, the Director General met in Vienna with H.E. Dr. H. Rohani, Secretary of the Supreme National Security Council of Iran, to discuss matters related to outstanding safeguards issues and Iran's decision to suspend all enrichment and reprocessing activities.

8. Between 10 and 28 January 2004, the Agency carried out safeguards inspections and DIV at Natanz, Karaj, ENTC and TNRC. The Agency also carried out complementary access at the Kalaye Electric Company workshop and at a number of hot cells located in the TNRC Jabr Ibn Hayan Laboratories (JHL). The Agency was also granted access to a number of military sites to take environmental samples at workshops involved in the domestic production of gas centrifuge components.

9. On 3 and 4 February 2004, the Director General met in Vienna with a high level delegation from Iran to discuss further the outstanding safeguards issues and the implementation of Iran's decision to suspend enrichment and reprocessing activities.

10. Between 15 and 19 February 2004, the Agency conducted inspections in Iran involving follow up actions from previous inspections, including the verification of nuclear material declared to the Agency in October 2003 on the basis of provisional data and for which additional characterization by Iran had been requested.

11. On 17 February 2004, a delegation of senior Iranian officials met with the Director General to inform the Agency that additional information would be provided as a follow up on issues discussed at the earlier meeting in February. This information was conveyed to the Agency in a letter dated 20 February 2004, and is in the process of being assessed.

12. On 21 February 2004, the Director General met in Vienna with Dr. Rohani to review outstanding safeguards issues and the Agency's verification of the suspension of enrichment and reprocessing activities.

B. Verification Activities

B.1. Uranium Conversion

B.1.1. The Uranium Conversion Facility

13. As reflected in the Director General's November 2003 report (para. 22; Annex 1, para. 5), Iran had stated to the Agency that it had designed the Uranium Conversion Facility (UCF), presently under construction at ENTC, without having tested a number of key conversion processes.

14. During the January 2004 visit, Agency conversion experts were provided access to an extensive set of drawings and technical reports related to the UCF project that had been provided by a foreign supplier. On the basis of a preliminary examination of these documents, Iran's declaration that UCF is being built essentially on the basis of these drawings and technical reports, augmented by training provided by the supplier country, appears to be credible. However, further comparison of the documents with the as-built components of UCF is necessary to confirm this preliminary conclusion.

15. As previously reported, the Agency has raised with Iran questions related to the purpose and use of uranium metal to be produced at UCF (GOV/2003/75, para. 25; Annex 1, paras 3–4). In July 2000, Iran provided design information to the Agency that indicated, inter alia, a process line for the conversion of low enriched UF_6 to low enriched uranium (LEU) metal (30 kg per year of uranium metal enriched to 19.7% uranium-235 (U-235)) and a process line for the conversion of depleted UF_6 to depleted uranium metal (50 tonnes per year of depleted uranium metal). In the course of conducting a DIV in 2002, the Agency noticed that the depleted uranium metal process line had been changed to a process line for natural uranium metal production. Iran later acknowledged that the uranium metal had been intended not only for producing shielding material, but also for the laser enrichment programme. The Agency is continuing to assess the explanations provided by Iran regarding its intended use of uranium metal.

B.1.2. Experiments and Testing

16. In its letter of 21 October 2003, Iran acknowledged that it had conducted laboratory and bench-scale conversion experiments in the Uranium Conversion Laboratory (UCL) at the ENTC, at the former Radiochemical Laboratories located at TNRC and at JHL, using nuclear material which had been imported in 1977, 1982 and 1991 (see GOV/2003/75, paras 20–24). Iran further stated that it had transferred relevant dismantled equipment used in the bench scale processes at TNRC to the Radioactive Waste Storage Facility (RWSF) at Karaj.

17. As previously agreed by the Iranian authorities, on 20 November 2003, Iran provided design information for the RWSF and revised design information for JHL, and, on 21 November 2003, the inventory change reports (ICRs) relevant to the experiments. Additional technical information has also been provided by Iran with respect to several areas of the experimental conversion work, including the area of uranium metal production.

18. During the Agency's October 2003 inspection at TNRC, Iran presented to the Agency for its verification 17 kg of uranium of different compounds collected from throughout the site, part of which had resulted from the conversion experiments and for which limited information was available. Work is continuing on the characterization of the nuclear material involved in the experiments, including with respect to its origin, use and quantity.

19. On 14 and 15 January 2004, Agency inspectors visited Karaj to monitor the recovery of nuclear material hold-up from the dismantled equipment used in the conversion experiments. Approximately 1.25 kg of uranium in different forms was recovered during this operation and samples from the uranium compounds were taken for destructive analysis. It was agreed that the equipment could be further dismantled by Iran and discarded after the results of Agency analysis became available and provided that the results are in agreement with Iran's declarations.

20. Analysis of data supplied by the Iranian authorities is continuing, and further analytical measurements are being carried out, with a view to confirming Iran's declaration concerning these activities to ensure the absence of pilot scale conversion. It should be noted that, given the size and capacity of the equipment used, the possibility cannot be excluded that larger quantities of nuclear material could have been involved than those declared by Iran as having been consumed and produced during this testing and experimentation. However, it is very difficult to account precisely for the uranium involved in these processing activities after the passage of many years, especially when some quantities have been declared as having been discarded. The Agency will investigate this further.

B.2. Irradiation and Reprocessing Experiments

21. In the course of 2003, Iran acknowledged its past irradiation in the Tehran Research Reactor (TRR) of depleted UO_2 targets that had been prepared at ENTC, and the subsequent reprocessing of

some of the irradiated targets in shielded glove boxes at TNRC (GOV/2003/75, Annex 1, paras 27-33). According to Iran, 7 kg of UO_2 were irradiated, 3 kg of which were subsequently reprocessed for the separation of plutonium, and the remaining 4 kg buried in containers on the site of TNRC.

22. The glove boxes in which the reprocessing is said to have been conducted were dismantled and stored in a warehouse at ENTC, along with related equipment. During the inspections that took place in November and December 2003, the Agency collected environmental samples from the glove boxes and equipment. The results of the sample analysis are not yet available.

23. The solidified wastes from these activities were declared by Iran as having been mixed in concrete and sent to Anarak, and the liquid wastes to Qom, where they were disposed of. As requested by the Agency, Iran transferred the Anarak waste to JHL in January 2004.

24. Iran has now, as a corrective action, also submitted accounting reports covering the movements of the irradiated targets between ENTC, TRR and JHL.

25. On 8 November 2003, the separated plutonium resulting from these experiments was presented for Agency verification in the form of plutonium solution contained in two small bottles. The contents of one of the bottles had completely leaked into its over-pack container, so an exact verification of the original volume of plutonium solution will not be possible. Agency inspectors took samples of the solution for laboratory analysis, the results of which are not yet available.

26. Iran has estimated that the original amount of plutonium in the solution was approximately 200 µg. Until sample results are available, the Agency cannot verify the accuracy of that estimate. However, based on Agency calculations, the amount of plutonium produced in 3 kg of depleted uranium targets under the declared irradiation conditions should have been substantially higher. The reason for this apparent discrepancy is not yet clear. The matter remains under discussion with Iran.

27. On 8 November 2003, during an Agency inspection at JHL, inspectors were also shown four heavily shielded containers said by Iran to contain the 4 kg of unprocessed targets. The containers had been buried on the site of TNRC, but were disinterred and presented to the Agency for verification. Using available non-destructive analysis equipment, Agency inspectors were able to confirm that one of the containers (selected at random) contained highly radioactive material characteristic of irradiated targets. All four containers have been placed under Agency seal for future examination.

28. In September 2003, Agency inspectors, aware by then that undeclared uranium irradiation had taken place in the TRR, noticed from available records that bismuth metal samples had also been irradiated in the same general period (1989–1993). Although bismuth is not nuclear material requiring declaration under the Safeguards Agreement, its irradiation is of interest to the Agency as it produces polonium-210 (Po-210), an intensely radioactive alpha emitting radioisotope[3] that could be used not only for certain civilian applications (such as radioisotope thermoelectric generators (RTGs), in effect, nuclear batteries[4]), but also, in conjunction with beryllium, for military purposes (specifically, as a neutron initiator in some designs of nuclear weapons).

29. In a letter to the Agency dated 13 November 2003, Iran informed the Agency that the bismuth irradiation had been part of a feasibility study for the production and use of Po-210 in RTGs.

30. During its visits to Iran in November and December 2003, the Agency requested further clarification and, in January 2004, was able to interview two Iranian scientists involved in the bismuth

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[3] Po-210 has a half-life of 138 days.

[4] The reported applications of Po-210 based RTGs are limited in number.

irradiation. One of the scientists is currently living outside of Iran and was asked by Iran to return for the interviews. According to the scientists, two bismuth targets had been irradiated, and an attempt had been made, unsuccessfully, to extract polonium from one of them. The other irradiated bismuth target was said to have been discarded. The scientists confirmed that the purpose of the project had been only for research on the chemical separation of polonium and the development of RTGs. During follow-up discussions in Vienna in February 2004, Iranian officials said that the experiments involving Po-210 were also part of a study about neutron sources, noting that commercially available neutron sources, used, for example, for industrial applications, are not obtainable by Iran due to import restrictions. However, Iran has stated that there are few remaining records related to the bismuth irradiation project and, as a result, has not been able to provide evidence to support its claims as to the stated purpose.

31. The Agency will continue to follow up on this matter as appropriate.

B.3. Uranium Enrichment

B.3.1. Gas Centrifuge Enrichment

32. As previously agreed, ICRs for the Pilot Fuel Enrichment Plant (PFEP) covering the nuclear material used for enrichment experiments at the Kalaye Electric Company workshop (and now located at PFEP) have been provided by Iran, and relevant parts of the design information for PFEP have been updated.

33. As reported in the Director General's earlier reports, Iran imported UF_6 in 1991. The material was contained in three cylinders, a large one and two smaller ones. Iran initially attributed the absence of 1.9 kg of the UF_6 from the two small cylinders to leakage during their storage in the TRR building. Environmental samples taken from that storage area, at the request of the Atomic Energy Organization of Iran (AEOI), did in fact reveal particles of UF_6. However, the explanations concerning leakage were not technically credible. As indicated in the Director General's report of November 2003 (para. 32; Annex 1, para. 21), Iran subsequently confirmed that it had in fact used that material in centrifuge tests at the Kalaye Electric Company workshop. Iran has been asked to provide explanations for the UF_6 contamination detected in the TRR building where the two small cylinders were stored, specifically as regards the source of the contaminant material and its current location, as well as the date on which the contamination took place.

34. In its 21 October 2003 declaration, Iran declared the 1.9 kg of UF_6 as hold-up in the dismantled equipment currently stored at PFEP. Verification of the hold-up is planned. Destructive analysis still needs to be undertaken on the contents of the imported UF_6 cylinders, which are currently stored under Agency seal at TNRC.

35. As described in GOV/2003/75 (paras 34 and 35; Annex 1, paras 38–41, 45, 53), environmental samples taken by the Agency at Natanz and at the Kalaye Electric Company workshop have revealed particles of natural uranium, LEU and high enriched uranium (HEU) that called into question the completeness of Iran's declarations about its centrifuge enrichment activities.

36. As part of its efforts to resolve the issue of contamination, the Agency has continued to take environmental samples of the imported and domestically manufactured centrifuge components and equipment located at Natanz. The Agency has also recently requested another State to provide access for environmental sampling at locations from which the imported centrifuges are believed to have originated. Taking environmental samples at such locations is indispensable for the Agency to arrive at conclusions regarding the issue of contamination.

37. In its declaration of 21 October 2003, Iran provided the names of manufacturing workshops involved in the domestic production of centrifuge components. In response to a further request by the

Agency, Iran supplied the Agency with the locations of the workshops and information on their functions in connection with Iran's centrifuge enrichment programme. Most of the workshops are owned by military industrial organizations.

38. In January 2004, the Agency was granted managed access to the component manufacturing workshops to take environmental samples with a view to clarifying the reasons for contamination of the domestically produced centrifuge components. While the results from those samples are pending, the results from earlier sampling campaigns have become available, and confirm the Agency's earlier findings (GOV/2003/75, paras 34–35; Annex 1, paras 38–40, 53).

39. On the basis of environmental sample analysis thus far, there remain a number of discrepancies and unanswered questions:

- Analysis of samples taken from domestically manufactured centrifuge components show predominantly LEU contamination, while analysis of samples from imported components show both LEU and HEU contamination. It is not clear why the components would have different types of contamination if, as Iran states, the presence of uranium on domestically manufactured components is due solely to contamination originating from imported components.
- The types of uranium contamination found at the Kalaye Electric Company workshop differ from those at Natanz, even though Iran states that the source of contamination in both cases is the imported centrifuge components.
- Environmental samples showing uranium enriched to 36% U-235 have come almost entirely from one room in the Kalaye Electric Company workshop, which seems to be predominantly contaminated with that material. Only negligible traces of 36% enriched uranium have been found on imported centrifuge components. The level of contamination suggests the presence of more than just trace quantities of such material.[5]

40. Iran has been asked to provide comments on the above issues, particularly in light of its declaration that it has not enriched uranium to more than 1.2% U-235 using centrifuge technology. The Agency continues to work with the country from which the imported components are believed to have originated with a view to resolving the issues associated with the contamination.

41. Agency visits in January 2004 to the component manufacturing workshops revealed the existence of two subsidiary companies of the Kalaye Electric Company[6]: Farayand Technique located near Esfahan, and Pars Trash in Tehran.

42. Farayand Technique has had a number of different roles in Iran's centrifuge enrichment programme. According to Iran, it had been intended to be the centrifuge assembly site, but the Iranian authorities decided that it was too far away from Natanz. It is currently said to be the Quality Control Centre for all centrifuge components manufactured for the facilities at Natanz, but it also has capabilities suitable for the testing and assembly of centrifuges.

43. As reported earlier, the Agency has continued to investigate the chronology of Iran's gas centrifuge enrichment programme and to assess the declarations concerning that programme made by Iran in its letter of 21 October 2003. The Agency's investigations, which have included discussions with former Iranian officials familiar with the programme, together with Agency verification activities

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[5] 36% enriched uranium is characteristic of nuclear material used in certain research reactors outside of Iran.

[6] Kalaye Electric Company is a subsidiary of the AEOI.

elsewhere, led the Agency to consider that Iran might have had drawings of a more advanced centrifuge design, a so-called P-2 centrifuge.[7]

44. In response to the Agency's inquiry in early January 2004 about this possibility, Iran acknowledged on 20 January 2004, during a meeting with the Agency's uranium enrichment experts, that it had received P-2 centrifuge drawings from foreign sources in 1994 and that it had conducted some mechanical tests, without nuclear material, using domestically manufactured rotors. The Iranian authorities showed the Agency a set of P-2 drawings, which they said Iran had acquired from a foreign intermediary. The Agency's centrifuge enrichment experts confirmed that the drawings were similar to a more advanced early European origin centrifuge design using maraging steel rotors with bellows. The Iranian authorities stated, however, that Iran had not obtained any P-2 centrifuges, or components thereof, from abroad, and that what components Iran did have, it had produced domestically.

45. Iran also provided information on the P-2 research and development activities, stating that the AEOI, in 1999 or 2000, concluded a contract with a private company located in Tehran, to develop a P-2 centrifuge. The Agency was able to interview the owner of that company during a meeting on 28 January 2004. The owner explained that, since in his view Iran was not capable of manufacturing appropriate maraging steel cylinders with bellows called for in the P-2 design, it was decided that work should proceed on a shorter, sub-critical carbon composite rotor. As a consequence, according to him, the company had manufactured seven rotors with various dimensions, and had performed some mechanical tests on those rotors without, however, using nuclear material. The owner of the company also stated that the work had been terminated after June 2003 and all of the centrifuge equipment was moved to the Pars Trash Company in Tehran.

46. In response to an Agency question as to why the P-2 design, and related work on it, had not been included in Iran's 21 October 2003 declaration, the Iranian authorities stated that they had, due to time pressure in preparing the declaration on the centrifuge research and development programme, neglected to include it. This explanation is difficult to comprehend since, as stated by Iran, the equipment had been moved only after June 2003 on the instruction of the AEOI to Pars Trash, where, as indicated in the Director General's November 2003 report (Annex 1, para. 41), the P-1 centrifuge equipment from the Kalaye Electric Company workshop had been stored and concealed from the Agency after its dismantlement in the spring of 2003 until October 2003, when it was presented to the Agency at Natanz.

47. In further discussions on this issue in February 2004, the Iranian authorities provided additional explanations for the non-inclusion in the October 2003 declaration of information related to the P-2 design and related work: (a) it had not mentioned specifically the P-1 centrifuges either in that declaration[8], (b) the declaration only included information intended to correct the failures of Iran in reporting under its Safeguards Agreement and (c) the information was not required to be reported under its Safeguards Agreement, but only under the Additional Protocol. The question remains, however, as to why, at the time it informed the Agency of the existence of the P-1 centrifuges and associated activities, Iran did not inform the Agency of the existence of the P-2 components, the work thereon under an AEOI contract, and the transfer of all related equipment to Pars Trash after June 2003.

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[7] Heretofore, all information provided by Iran concerning its centrifuge enrichment programme (including the centrifuge design and information on research and development, production and processing, and the locations where such activities were carried out) involved an earlier, less advanced centrifuge design (P-1) of European origin.

[8] It should be noted, however, that the 21 October 2003 declaration contained details about the P-1 centrifuges and Iran's work associated with such centrifuges.

48. The Agency is currently investigating all of the information available to it concerning the P-2 centrifuge issue.

B.3.2. Laser Enrichment

49. In its letter of 21 October 2003, Iran declared that, starting in the 1970s, it had had contracts related to laser enrichment using Atomic Vapour Laser Isotope Separation (AVLIS) and Molecular Laser Isotope Separation (MLIS) techniques, and had imported equipment under those contracts. Iran also informed the Agency that it had imported 50 kg of uranium metal in 1993, some of which was used in experiments involving the imported equipment at TNRC and at Lashkar Ab'ad. Iran informed the Agency that the laser equipment was dismantled in May 2003 and transferred to Karaj, along with the uranium metal (the latter was subsequently transferred to JHL). The equipment and material were presented to Agency inspectors prior to the issuance of the November report. Environmental samples were collected from the equipment, and the nuclear material was verified by weighing and through destructive analysis.

50. As a corrective action, Iran has submitted all of the ICRs relevant to the use of the uranium metal that was presented for Agency verification in November 2003. Iran has also submitted design information for the RWSF at Karaj and amended design information for JHL to cover the additional laser laboratories as well as waste tanks containing nuclear material.

51. The Agency has continued its examination of nuclear material accountancy records related to the AVLIS programme and has taken additional environmental samples since November 2003 from key equipment and associated laboratories and destructive analysis samples from the waste tanks used in connection with the programme. The results of the sample analyses are still pending.

52. Having received from Iran additional information and amplifications of its 21 October 2003 declaration, the Agency is continuing with its assessment of the chronology of Iran's laser enrichment programme. With the support of relevant Member States, the Agency has attempted to reconcile the deliveries of key equipment with information provided by Iran in connection with its AVLIS and MLIS programmes. While the information related to the MLIS programme in the 1970s appears to be coherent, more information is still expected from Member States with regard to deliveries of equipment related to Iran's AVLIS programme.

53. During the Agency's complementary access to the mass spectrometry laboratories at Karaj in December 2003, the Agency examined two mass spectrometers that had not been included in Iran's declaration of 21 October 2003. Iran acknowledged that the mass spectrometers had been used in the past to provide analytical services (isotope enrichment measurements) to the AVLIS programme. Iran also provided a list of samples that had been analysed. The Agency collected environmental samples from the mass spectrometers, the results of which are still pending.

54. Following the complementary access at Karaj, the Agency requested Iran to clarify the role of the mass spectrometers in relation to Iran's uranium enrichment programme. Iran submitted additional information in that regard to the Agency on 5 January 2004.

55. Further assessment is pending evaluation of the new information and the verification results from recent inspections, including the results of environmental and other sample taking during the December 2003 and January 2004 inspections and the ongoing detailed study of information related to AVLIS equipment design.

B.4. Heavy Water Reactor Programme

56. In 2003, Iran declared to the Agency its construction at Arak of a Heavy Water Production Plant and its planned construction of a heavy water reactor, the Iran Nuclear Research Reactor (IR-40). Iran

provided preliminary design information on the reactor, along with preliminary information on a facility intended to manufacture fuel for the IR-40, the Fuel Manufacturing Plant (FMP), to be built on the Esfahan site.

57. In mid-2003, the Agency was provided with drawings of the reactor that contained no references to hot cells. In its declaration of 21 October 2003, Iran stated that two hot cells had been foreseen for the project, but that neither the design nor detailed information about the dimensions or the actual layout of the hot cells was available at present. Iran later stated that it had tentative plans to construct at Arak an additional building with hot cells for the production of radioisotopes to produce "long lived" radioisotopes. Iran has provided some very preliminary design information on the building.

B.5. Suspension of Enrichment Related and Reprocessing Activities

B.5.1. Scope of Suspension

58. As reported by the Director General to the November 2003 meeting of the Board, Iran informed him on 10 November 2003 of its decision to suspend enrichment related and reprocessing activities, and that the suspension would cover all activities at the Natanz enrichment facility, the production of all feed material for enrichment and the importation of any enrichment related items.

59. In its Note Verbale of 29 December 2003, Iran further informed the Agency, that, with immediate effect:

- it would suspend the operation and/or testing or any centrifuges, either with or without nuclear material, at PFEP at Natanz;
- it would suspend further introduction of nuclear material into any centrifuges;
- it would suspend installation of new centrifuges at PFEP and installation of centrifuges at the Fuel Enrichment Plant (FEP) at Natanz; and
- it would withdraw nuclear material from any centrifuge enrichment facility if and to the extent practicable.

60. Iran also stated that: it did not currently have any type of gas centrifuge enrichment facility at any location in Iran other than the facility at Natanz that it was now constructing, nor did it have plans to construct, during the suspension period, new facilities capable of isotopic separation; it had dismantled its laser enrichment projects and removed all related equipment; and it was not constructing nor operating any plutonium separation facility.

61. In addition, Iran stated that: during the period of suspension, Iran did not intend to make new contracts for the manufacture of centrifuge machines and their components; the Agency could fully supervise storage of all centrifuge machines assembled during the suspension period; Iran did not intend to import centrifuge machines or their components, or feed material for enrichment processes, during the suspension period; and there was no production of feed material for enrichment processes in Iran.

62. On 24 February 2004, Iran informed the Agency that instructions will be issued by the first week of March to implement the further decisions voluntarily taken by Iran to: (i) suspend the assembly and testing of centrifuges, and (ii) suspend the domestic manufacture of centrifuge components, including those related to the existing contracts, to the furthest extent possible. Iran also informed the Agency that any components that are manufactured under existing contracts that cannot be suspended will be stored and placed under Agency seal. Iran invited the Agency to verify these measures. Iran also confirmed that the suspension of enrichment activities applied to all facilities in Iran.

B.5.2. Monitoring Activities

63. On 12 November 2003, Iran shut down all centrifuges at the cascade hall of PFEP. The feed cylinder was removed from the autoclave, and Agency inspectors sealed all feed and withdrawal stations and chemical and cold traps. The cascade hall continues to be under Agency surveillance, adjusted to accommodate the need to verify that no enrichment is taking place. During inspections carried out in November and December 2003, the Agency completed the sealing of all declared UF_6 feed material. Since then, all containment and surveillance devices have been checked during monthly inspections, confirming the non-operational status of the facility. Design information verification was also carried out at FEP on 10 December 2003.

64. The dismantled pilot enrichment facility at the Kalaye Electric Company workshop in Tehran has also been monitored, using complementary access under the Additional Protocol.

65. The decommissioned AVLIS pilot plant at Lashkar Ab'ad and the decommissioned AVLIS and MLIS installations at TNRC have been monitored through complementary access. Dismantled AVLIS and MLIS related equipment currently stored at Karaj has been subject to inspection, DIV and complementary access.

66. In addition, all declared uranium metal was sealed on 12 November 2003. The non-production of UF_6 at UCF, and of uranium metal at UCF and TNRC, has been monitored through inspections, DIV and complementary access.

67. As a result of its monitoring activities, the Agency is able to confirm that there has been no operation or testing of any centrifuges, either with or without nuclear material, at PFEP; that no new centrifuges have been installed at PFEP; that no centrifuges have been installed at FEP; and that no nuclear material has been introduced into any centrifuges which have been declared to the Agency. Although some civil construction activities are still being carried out at Natanz, these activities are not directly related to the operation of the facilities located there.

68. Between November 2003 and mid-January, Iran continued to assemble centrifuges. During that time, Iran assembled some 120 centrifuges (in addition to the 800 centrifuges which had been produced prior to November 2003), which have been counted by the Agency. These, and any centrifuges assembled since mid-January 2004, will now be placed under Agency seal.

69. Iran has continued to manufacture centrifuge components domestically under existing contracts. In response to an Agency request, Iran agreed in its letter dated 20 February 2004 to present to the Agency in Iran the contracts between AEOI and the domestic manufacturers of centrifuge components. The Agency intends to discuss with Iran in the near future the additional activities necessary for verifying the expanded suspension, including the storage and sealing of domestically manufactured centrifuge components.

70. In relation to reprocessing, the Agency has been monitoring the use and construction of declared hot cells, including equipment used earlier for plutonium separation experiments at TNRC, ENTC, Karaj and Arak, through inspections, DIV, complementary access and the use of satellite imagery. The remaining irradiated unprocessed uranium targets were placed under Agency seal on 15 November 2003, and are being verified regularly.

C. Assessment and Next Steps

71. Iran has presented all declared nuclear material to the Agency for its verification. Iran has also provided all of the inventory change reports, material balance reports and physical inventory listings requested by the Agency. While some corrections are required and are still pending, this is partially due to the need to establish the nuclear material hold-up in dismantled equipment and other problems associated with nuclear material accountancy for past activities. In addition, Iran has submitted design information with respect to facilities, as requested by the Agency, although some of the information needs to be revised and/or supplemented, which Iran has agreed to do.

72. Iran has been actively cooperating with the Agency in providing access to locations requested by the Agency. This included access to workshops situated at military sites. This is welcome. Also welcome is the decision by Iran to expand the scope of suspension to cover remaining enrichment activities, which, in the Agency's view, will contribute to confidence building.

73. Although investigations are ongoing, the Agency has made good progress in verifying Iran's statements regarding the UCF project and the associated experiments and testing activities. The Agency has also been verifying the suspension of those enrichment and reprocessing activities specified in Iran's Note Verbale of 29 December 2003.

74. The omission from Iran's letter of 21 October 2003 of any reference to its possession of the P-2 centrifuge design drawings and associated research, manufacturing and mechanical testing activities is a matter of serious concern, particularly in view of the importance and sensitivity of those activities. It runs counter to Iran's declaration, a document characterized by Iran as providing "the full scope of Iranian nuclear activities" and a "complete centrifuge R&D chronology". The Director General has continued to emphasize to Iran the importance of declaring all the details of Iran's nuclear programme.

75. The Agency has still to resolve the major outstanding issue, of the LEU and HEU contamination found at the Kalaye Electric Company workshop and Natanz, and associated concerns. Until this matter is satisfactorily resolved, it will be very difficult for the Agency to confirm that there has not been any undeclared nuclear material or activities. The Agency is still waiting for Iran to provide requested information detailing the origin of the centrifuge equipment and components, the locations in Iran to which such equipment and components were moved and the associated details of timescales, and the names of individuals involved. The resolution of this issue will depend to a great extent on the cooperation of the country from which the imported items are believed to have originated.

76. Other issues requiring clarification include the nature and scope of Iran's activities in relation to P-2 centrifuges, and the nature and scope of Iran's laser isotope enrichment research and details of the associated equipment. The issue of the purpose of Iran's activities related to the production and intended use of Po-210 remains a concern, in the absence of information to support Iran's statements in this regard.

77. Although the timelines of the conversion and centrifuge programmes of Iran and the Socialist People's Libyan Arab Jamahiriya (Libya) are different, they share several common elements. The basic technology is very similar and was largely obtained from the same foreign sources. As part of verifying the correctness and completeness of the declarations of Iran and Libya[9], the Agency is investigating, with the support of Member States, whose full cooperation is essential, the supply routes and sources of such technology and related equipment and nuclear and non-nuclear materials.

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[9] See the Director General's report on the implementation of Libya's NPT Safeguards Agreement (GOV/2004/12, para. 38).

78. The Agency will continue its efforts to resolve and clarify the outstanding issues. In this context the Director General has requested Iran to continue and intensify its cooperation with the Agency, in particular through the prompt provision of detailed information. The Director General will report to the June 2004 meeting of the Board, or earlier, as appropriate.

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Item 3 (b) of the provisional agenda
(GOV/2003/71)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Report by the Director General

1. This report on safeguards issues in the Islamic Republic of Iran (hereinafter referred to as Iran) responds to paragraph 7 of the Board of Governors' resolution GOV/2003/69 of 12 September 2003. It covers relevant developments from the time of the Director General's visit to Iran on 20-21 February 2003 and Iran's acknowledgement of its centrifuge enrichment programme, but concentrates on the period since his last report (GOV/2003/63 of 26 August 2003). This report begins with the background to the issues in question (Section A) and a chronology of recent events (Section B). Information on the Agency's verification activities is summarized in Section C, organized according to the various technical processes involved (the details of which are set out in Annex 1). Section D provides a summary of the Agency's findings, while Section E sets out its current assessment and next steps. Annexes 2 and 3 to this report contain, respectively, a list of the locations identified to date as relevant to the implementation of safeguards in Iran, and a map showing those locations. Annex 4 is a list of relevant abbreviations and terms used in the text of the report.

A. Background

2. At the meeting of the Board of Governors on 17 March 2003, the Director General reported on discussions taking place with Iran on a number of safeguards issues that needed to be clarified and actions that needed to be taken in connection with the implementation of the Agreement between Iran and the IAEA for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/214) (the Safeguards Agreement).

3. On 6 June 2003, the Director General submitted to the Board of Governors a report (GOV/2003/40) providing further information on the nature of the safeguards issues involved and the actions that needed to be taken, and describing developments in that regard since March 2003. In that report, the Director General stated that Iran had failed to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material imported into Iran and the subsequent

processing and use of the material, and the declaring of facilities and other locations where the material had been stored and processed. He described these failures and the actions being taken by Iran to correct them.

4. On 18-19 June 2003, the Board considered the above report of the Director General. In its conclusions, the Board noted its concern about the number of past failures by Iran to report material, facilities and activities as required by its safeguards obligations,[1] and noted the actions taken by Iran to correct those failures. The Board urged Iran to rectify promptly all of the safeguards problems identified in the Director General's report and to resolve questions that remained open. It welcomed Iran's reaffirmed commitment to full transparency and expressed its expectation that Iran would grant the Agency all necessary access. The Board encouraged Iran, as a confidence building measure, not to introduce nuclear material at the Pilot Fuel Enrichment Plant (PFEP) located at Natanz pending the resolution of related outstanding issues. The Board called on Iran to co-operate fully with the Agency in its ongoing work. It welcomed Iran's readiness to look positively at signing and ratifying an Additional Protocol, and urged Iran to promptly and unconditionally conclude and implement such a protocol, in order to enhance the Agency's ability to provide credible assurances regarding the peaceful nature of Iran's nuclear activities, particularly the absence of undeclared material and activities.

5. On 26 August 2003, the Director General submitted to the Board for its consideration a further report (GOV/2003/63) on relevant developments since June 2003. The report included: a summary of the state of the Agency's understanding of Iran's nuclear programme at that time, the Agency's findings and assessments, including the identification of some additional failures to report and the issues that needed to be clarified (particularly with regard to enrichment), and the corrective actions that needed to be taken. In the report, the Director General noted an increased degree of co-operation by Iran, while noting that some of the information and access were at times slow in coming and incremental, and that some of the information was in contrast to that previously provided by Iran.

6. At its meeting on 12 September 2003, the Board of Governors adopted a resolution (GOV/2003/69) in which it, inter alia:

- Called on Iran to provide accelerated co-operation and full transparency to allow the Agency to provide at an early date the assurances required by Member States (GOV/2003/69, para. 1).
- Called on Iran to ensure that there were no further failures to report material, facilities and activities that Iran is obliged to report pursuant to its Safeguards Agreement (GOV/2003/69, para. 2).
- Called on Iran to suspend all further uranium enrichment related activities and, as a confidence building measure, any reprocessing activities, pending provision by the Director General of the assurances required by Member States and pending satisfactory application of the provisions of the Additional Protocol (GOV/2003/69, para. 3).
- Decided that, in order to ensure Agency verification of non-diversion of nuclear material, it was essential and urgent that Iran remedy all failures identified by the Agency and co-operate fully with the Agency by taking certain specified actions by the end of October 2003 (GOV/2003/69, para. 4).
- Requested all third countries to co-operate closely and fully with the Agency in the clarification of open questions on the Iranian nuclear programme (GOV/2003/69, para. 5).
- Requested that Iran work with the Secretariat to sign, ratify and fully implement the Additional Protocol promptly and unconditionally, and as a confidence building measure to act henceforth in accordance with the Additional Protocol (GOV/2003/69, para. 6).

7. The Board also asked the Director General to submit a report to the Board, in November 2003 or earlier if appropriate, on the implementation of the Board's resolution, enabling it to draw definitive conclusions.

B. Chronology since September 2003

8. Between 14 and 18 September 2003, the Agency conducted a safeguards inspection at the Tehran Research Reactor (TRR) and at the PFEP in Natanz. The inspection activities at TRR included physical inventory verification and design information verification, as well as a number of activities to follow up on issues related to the natural uranium imported in 1991, including further examination of the cylinders from which imported UF_6 gas was said to have leaked (see GOV/2003/63, para. 18).

9. On 16 September 2003, the Agency met representatives of Iran to discuss the results of the analysis of the environmental samples taken at the Kalaye Electric Company in August 2003, which had revealed the presence of high enriched uranium (HEU) particles and low enriched uranium (LEU) particles which were not consistent with the nuclear material in the declared inventory of Iran. Also discussed were the results of the environmental sampling taken at PFEP, which had revealed the presence of other types of HEU particles, as well as LEU and other particles, not of a type on Iran's inventory.

10. The Deputy Director General for Safeguards (DDG-SG) and the Director of Safeguards Operations Division B (DIR-SGOB) travelled to Iran on 2–3 October 2003 to discuss the most urgent safeguards implementation issues that remained open. Following these discussions, a technical team of the Agency visited Iran from 4 to 17 October 2003 in order to carry out activities related to the verification of Iran's activities in the areas of uranium conversion and laser and gas centrifuge enrichment. Following up on recent open source reports of enrichment activities being undertaken at an industrial complex in Kolahdouz in western Tehran, the team was permitted on 5 October 2003 to visit three locations which the Agency had identified as corresponding to those mentioned in the reports. While no work was seen at those locations that could be linked to uranium enrichment, environmental samples were taken.

11. In a letter to the Agency dated 9 October 2003 from Mr. B. Khalilipour, Vice President of the Atomic Energy Organization of Iran (AEOI), Iran provided information that had not been provided earlier on research activities carried out on uranium conversion processes, including acknowledgement of laboratory and bench scale experiments. Specifically, Iran confirmed that, between 1981 and 1993, it had carried out at the Esfahan Nuclear Technology Centre (ENTC) bench scale preparation of UO_2 and, at the Tehran Nuclear Research Centre (TNRC), bench scale preparation of ammonium uranyl carbonate (AUC), UO_3, UF_4 and UF_6.

12. Between 13 and 22 October 2003, an Agency inspection team conducted safeguards inspections at PFEP and other facilities in Esfahan and Tehran. These inspections included follow-up activities related to the HEU and LEU particles found at the Kalaye Electric Company and at Natanz and to the newly acknowledged existence of nuclear material resulting from uranium conversion experiments.

13. On 16 October 2003, at the invitation of the Iranian Government, the Director General met in Tehran with H.E. Dr. H. Rohani, Secretary of the Supreme National Security Council of Iran, to discuss the open issues requiring urgent resolution. These issues related to the use of nuclear material in the testing of centrifuges (including the presence of LEU and HEU particles at the Kalaye Electric Company and at Natanz); the testing of conversion processes; the purpose of uranium metal

production, the existence of laser isotope enrichment; and details of Iran's heavy water reactor programme. At this meeting, Dr. Rohani stated that a decision had been taken to provide the Agency, in the course of the following week, with a full disclosure of Iran's past and present nuclear activities. He also expressed Iran's readiness to conclude an Additional Protocol and, pending its entry into force, to act in accordance with the Protocol and with a policy of full transparency.

14. Upon the request of the Iranian authorities, a meeting was held on 18–19 October 2003, also in Tehran, between legal, policy and technical staff of the Agency and Iranian officials to discuss issues related to the conclusion by Iran of an Additional Protocol.

15. As a follow-up to the 16 October 2003 meeting, in a letter to the Director General dated 21 October 2003 and received on 23 October 2003, H.E. Mr. R. Aghazadeh, Vice President of the Islamic Republic of Iran and President of the AEOI, reaffirmed that "the Islamic Republic of Iran ha[d] decided to provide a full picture of its nuclear activities, with a view to removing any ambiguities and doubts about the exclusively peaceful character of these activities and commencing a new phase of confidence and co-operation in this field at the international level." Mr. Aghazadeh stated further in his letter that Iran was prepared "to provide, in full transparency, any additional clarifications that the Agency may deem necessary."[3]

16. In that letter, Iran acknowledged that: between 1998 and 2002 it had carried out some testing of centrifuges at the Kalaye Electric Company using UF_6 imported in 1991; between 1991 and 2000 it had had a laser enrichment programme, in the course of which it had used 30 kg of uranium metal not previously declared to the Agency; and between 1988 and 1992 it had irradiated 7 kg of UO_2 targets and extracted small quantities of plutonium. Attached to the letter was significant additional information with respect to those activities, as well as information concerning Iran's conversion and heavy water reactor programmes.

17. Between 27 October and 1 November 2003, a technical team from the Agency, led by DIR-SGOB and including centrifuge technology experts, visited Iran to follow up on these and other ssues, including, in particular, the source of HEU and LEU contamination.

18. On 16 November 2003, the Agency received from the Government of Iran a letter of the same date in which Iran conveyed its acceptance of the draft text of the Additional Protocol based on the Model Additional Protocol (INFCIRC/540 (Corr.)). Iran indicated that it was prepared to sign the Additional Protocol, and that, pending its entry into force, Iran would act in accordance with the provisions of that Protocol.

9. On the same day, the Iranian Government informed the Director General that it had decided to suspend, with effect from 10 November 2003, all enrichment related and reprocessing activities in ran[4], and specifically: to suspend all activities on the site of Natanz, not to produce feed material for nrichment processes and not to import enrichment related items.

In his letter, Mr. Aghazadeh also referred to his Government's expectation that the Agency would "take cognizance, in reparing its report, of Iran's concerns and constraints for the full disclosure of detailed information about these activities in e past, notably the concern about expansion of illegal sanctions to prevent Iran from exercising its inalienable right to uclear technology for peaceful purposes stipulated in Article IV of the [Treaty on the Non-Proliferation of Nuclear Veapons]."

It should be noted also that, on 21 October 2003, the Iranian Government and the Foreign Ministers of France, Germany nd the United Kingdom issued in Tehran an agreed statement on Iran's nuclear programme. In that statement, Iran indicated at it had "decided voluntarily to suspend all uranium enrichment and reprocessing activities as defined by the IAEA."

C. Verification Activities

C.1. Uranium Conversion

20. The Agency received preliminary design information on the Uranium Conversion Facility (UCF) under construction at ENTC in July 2000, and has been carrying out continuous design information verification (DIV) since then. In that design information, the facility was described as being intended for the conversion of uranium ore concentrate into UF_6, for enrichment outside Iran, and for the subsequent conversion (at UCF) of the enriched UF_6 into low enriched UO_2, enriched uranium metal and depleted uranium metal. Following its declaration of the enrichment facilities at Natanz in February 2003, Iran acknowledged that it intended to carry out the enrichment activities domestically using UF_6 to be produced by UCF.

21. At the time of the Director General's last report to the Board of Governors (GOV/2003/63), questions remained about the completeness of Iran's declarations concerning the chronology and details of its uranium conversion activities, in particular in light of its previous assertion that it had designed UCF without having used nuclear material to test the most difficult conversion processes.

22. While Iran acknowledged in February 2003 having used some of the *natural* uranium imported in 1991 for testing certain parts of the conversion process (i.e. uranium dissolution, purification using pulse columns and the production of uranium metal), it denied having tested other processes (e.g. conversion of UO_2 to UF_4 and conversion of UF_4 to UF_6), stating that they had been developed based on the supplier's drawings. In a letter dated 19 August 2003, Iran further acknowledged that it had carried out UF_4 conversion experiments on a laboratory scale during the 1990s at the Radiochemistry Laboratories of TNRC using imported *depleted* UO_2 which had previously been declared as having been lost during processing (process loss). This activity was acknowledged by Iran only after the Agency's July 2003 waste analysis results indicated the presence of depleted UF_4.

23. On 9 October 2003, Iran further acknowledged that, contrary to its previous statements, practically all of the materials important to uranium conversion had been produced in laboratory and bench scale experiments (in kilogram quantities) between 1981 and 1993 without having been reported to the Agency. These activities were carried out at TNRC and ENTC.

24. The information provided in Iran's letter of 21 October 2003 reveals that, in conducting these experiments, Iran had used nuclear material imported by Iran in 1977 and 1982, some of which had been exempted from safeguards, as well as safeguarded nuclear material which had been declared to the Agency as a process loss. Iran also declared that, using nuclear material imported in 1991 and reported to the Agency in February 2003, experiments had been carried out on the conversion of some of the UF_4 to UF_6, and on the conversion of UO_2 to UF_4. On 1 November 2003, Iran agreed to submit all relevant inventory change reports (ICRs) and design information to cover these activities.

25. In addition to the issues associated with the testing of UCF processes, the Agency had previously raised with Iran questions related to the purpose and use of nuclear material to be produced at UCF, such as uranium metal. In its letter of 21 October 2003, Iran acknowledged that the uranium metal had been intended not only for the production of shielding material, as previously stated, but also for use in the laser enrichment programme (as discussed below).

C.2. Reprocessing Experiments

26. In its letter of 21 October 2003, Iran acknowledged the irradiation of depleted UO_2 targets at TRR and subsequent plutonium separation experiments in a hot cell in the Nuclear Safety Building of TNRC. Neither the activities nor the separated plutonium had been reported previously to the Agency.

27. In the meetings held 27 October–1 November 2003, Iran provided additional information about these experiments. According to Iranian officials, the experiments took place between 1988 and 1992, and involved pressed or sintered UO_2 pellets prepared at ENTC using depleted uranium that had been exempted from safeguards in 1978. The capsules containing the pellets had been irradiated in TRR in connection with a project to produce fission product isotopes of molybdenum, iodine and xenon. The plutonium separation was carried out at TNRC in three shielded glove boxes, which, according to Iran, were dismantled in 1992 and later stored in a warehouse at ENTC along with related equipment. Iran stated that these experiments had been carried out to learn about the nuclear fuel cycle, and to gain experience in reprocessing chemistry.

28. According to Iran, a total of about 7 kg of UO_2 was irradiated, 3 kg of which was processed to separate plutonium. The small amount of separated plutonium was stored in a laboratory of Jabr Ibn Hayan Multipurpose Laboratories (JHL), while the remaining 4 kg of unprocessed irradiated UO_2 targets was placed in containers and stored at the TNRC site, and the wastes disposed of at the Qom salt marsh.

29. On 1 November 2003, Iran agreed to submit all nuclear material accountancy reports, and design information for ENTC and JHL, covering these activities. On that date, Iran also presented the separated plutonium and the irradiated unprocessed targets to Agency inspectors at JHL. Verification of the material, as well as of possible nuclear material hold-up in the dismantled glove boxes, is foreseen to take place during the 8–15 November 2003 inspection.

C.3. Uranium Enrichment

C.3.1. Gas Centrifuge Enrichment

30. In February 2003, Iran acknowledged the existence of two centrifuge enrichment plants under construction at Natanz: PFEP and a large commercial-scale Fuel Enrichment Plant (FEP). In February 2003, Iran also acknowledged that the workshop of the Kalaye Electric Company in Tehran had been used for the production of centrifuge components, but stated that there had been no testing of these components involving the use of nuclear material, either at the Kalaye Electric Company or at any other location in Iran. According to Iran, its enrichment programme was indigenous and based on information from open sources.

31. During the visit of 2–3 October 2003, the Agency was shown, for the first time, the centrifuge drawings previously requested by it (see GOV/2003/63, para. 28).

32. In its letter of 21 October 2003, Iran acknowledged that "a limited number of tests, using small amounts of UF_6, [had been] conducted in 1999 and 2002" at the Kalaye Electric Company. In a meeting with enrichment technology experts held during the 27 October–1 November 2003 visit, Iranian authorities explained that the experiments that had been carried out at the Kalaye Electric Company had involved the 1.9 kg of imported UF_6, the absence of which the State authorities had earlier attempted to conceal by attributing the loss to evaporation due to leaking valves on the cylinders containing the gas (see GOV/2003/63, para. 18).

33. During that visit, the Agency was able to meet with the individual who had been in charge of the centrifuge research and development work during the period 1992–2001 with a view to clarifying issues associated with these activities. Iran has agreed to provide the relevant ICRs and design information, and to present the nuclear material for Agency verification during the inspection scheduled for 8–15 November 2003.

34. As mentioned above, environmental samples taken by the Agency at PFEP and at the Kalaye Electric Company revealed particles of HEU and LEU indicating the possible presence in Iran of

nuclear material that had not been declared to the Agency. The Iranian authorities attributed the presence of these particles to contamination originating from centrifuge components which had been imported by Iran. In connection with its efforts to verify that information, the Agency requested, and Iran provided in October 2003, a list of imported and domestically produced centrifuge components, material and equipment, and an indication of the batches of items that Iran claims to have been the source of the contamination. The Agency carried out another sample-taking campaign in October 2003, at which time all major imported and domestically produced components, as well as various pieces of manufacturing equipment, were sampled.

35. In a meeting on 1 November 2003, the Iranian authorities stated that all nuclear material in Iran had been declared to the Agency, that Iran had not enriched uranium beyond 1.2% U-235 using centrifuges and that, therefore, the contamination could not have arisen as a result of indigenous activities. The Agency has now obtained information about the origin of the centrifuge components and equipment which Iran claims to be the source of HEU contamination. The Agency will continue its investigation of the source of HEU and LEU contamination, including through follow up with other relevant parties.

C.3.2. Laser Enrichment

36. As reflected in GOV/2003/63 (para. 41), Iran permitted the Agency to visit in August 2003 a laboratory located at Lashkar Ab'ad, which was described by Iran as originally having been devoted to laser fusion research and laser spectroscopy, but whose focus had been changed to research and development and the manufacture of copper vapour lasers (CVLs). In its 19 August 2003 letter to the Agency, Iran stated that it had had a substantial research and development programme on lasers, but that it currently had no programme for laser isotope separation.

37. During discussions which took place in Iran from 2 to 3 October 2003, in response to Agency questioning, the Iranian authorities acknowledged that Iran had imported and installed at TNRC laser related equipment from two countries: in 1992, a laser spectroscopy laboratory intended for the study of laser induced fusion, optogalvanic phenomena and photoionization spectroscopy, and in 2000, a large vacuum vessel, now stored at Karaj, for use in the spectroscopic studies referred to in the previous paragraph.

38. On 6 October 2003, Agency inspectors were permitted to take at Lashkar Ab'ad the environmental samples requested by the Agency in August 2003. The inspectors also visited a warehouse in the Karaj Agricultural and Medical Centre of the AEOI, where a large imported vacuum vessel and associated hardware were stored. The Iranian authorities stated that the equipment had been imported in 2000, that it had never been used, and that it had now been packed for shipment back to the manufacturer, since the contract related to its supply had been terminated by the foreign partner in 2000. The inspectors were informed that later during their visit to Tehran the equipment related to the laboratory imported in 1992 would be made available for examination and environmental sampling and the individuals involved in the projects would be available for interviews. However, these interviews and the presentation of the equipment were deferred by Iran.

39. In its letter dated 21 October 2003, Iran acknowledged that, starting in the 1970s, it had had contracts related to laser enrichment with foreign sources from four countries. These contracts are discussed in detail in Annex 1 to this report.

40. During the inspectors' follow-up visit to Iran between 27 October and 1 November 2003, Iran provided more information on Lashkar Ab'ad and acknowledged that a pilot plant for laser enrichment had been established there in 2000. The project for the establishment of the plant consisted of several contracts covering not only the supply of information, as indicated in Iran's letter of 21 October 2003 to the Agency, but also the delivery of additional equipment. Iran also stated that uranium laser

enrichment experiments had been conducted between October 2002 and January 2003 using previously undeclared natural uranium metal imported from one of the other suppliers. According to Iranian authorities, all of the equipment was dismantled in May 2003 and transferred to Karaj for storage together with the uranium metal. The equipment and material were presented to Agency inspectors at Karaj on 28 October 2003.

41. In the meeting of 1 November 2003, Iran agreed to submit all of the relevant ICRs and design information, and to present the nuclear material for Agency verification during the inspection scheduled for 8–15 November 2003.

C.4. Heavy Water Reactor Programme

42. On 12 July 2003, the Iranian authorities made a presentation on the technical features, said to have been based on indigenous design, of the Iran Nuclear Research Reactor (IR-40) to be constructed at Arak. The purpose of the reactor was declared to be research and development and the production of radioisotopes for medical and industrial use. Iran explained that it had tried to acquire a reactor from abroad to replace the old research reactor in Tehran (TRR), but that those attempts had failed, and that Iran had concluded, therefore, that the only alternative was a heavy water reactor which could use domestically produced UO_2 and zirconium. In order to have a sufficient neutron flux, a reactor with power on the order of 30–40 MW(th) was said to be required.

43. During their visit in July 2003, Agency inspectors were provided with drawings of the IR-40. Contrary to what would have been expected given the declared radioisotope production purpose of the facility, the drawings contained no references to hot cells. The Agency raised this issue during that visit, particularly in light of open source reports of recent efforts by Iran to acquire from abroad heavy manipulators and leaded windows designed for hot cell applications. The Agency indicated to the Iranian authorities that, given the specifications of the manipulators and windows which were the subject of those reports, a design for hot cells should have existed already and that therefore the hot cell, or cells, should already have been declared, at least on a preliminary basis, as part of the facility or as a separate installation.

44. In its letter of 21 October 2003, Iran acknowledged that two hot cells had been foreseen for this project. However, according to the information provided in that letter, neither the design nor detailed information about the dimensions or the actual layout of the hot cells was available yet, since they did not know the characteristics of the manipulators and shielded windows which they could procure. On 1 November 2003, Iran confirmed that it had tentative plans to construct at the Arak site yet another building with hot cells for the production of radioisotopes. Iran has agreed to submit the relevant preliminary design information with respect to that building in due course.

D. Findings

45. Iran's nuclear programme, as the Agency currently understands it, consists of a practically complete front end of a nuclear fuel cycle, including uranium mining and milling, conversion, enrichment, fuel fabrication, heavy water production, a light water reactor, a heavy water research reactor and associated research and development facilities.

46. Iran has now acknowledged that it has been developing, for 18 years, a uranium centrifuge enrichment programme, and, for 12 years, a laser enrichment programme. In that context, Iran has admitted that it produced small amounts of LEU using both centrifuge and laser enrichment processes.

and that it had failed to report a large number of conversion, fabrication and irradiation activities involving nuclear material, including the separation of a small amount of plutonium.

47. Based on all information currently available to the Agency, it is clear that Iran has failed in a number of instances over an extended period of time to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material and its processing and use, as well as the declaration of facilities where such material has been processed and stored. In his June and August 2003 reports to the Board of Governors (GOV/2003/40 and GOV/2003/63), the Director General identified a number of instances of such failures and the corrective actions that were being, or needed to be, taken with respect thereto by Iran.

48. Since the issuance of the Director General's last report, a number of additional failures have been identified. These failures can be summarized as follows:

(a) Failure to report:

  (i) the use of imported natural UF_6 for the testing of centrifuges at the Kalaye Electric Company in 1999 and 2002, and the consequent production of enriched and depleted uranium;

  (ii) the import of natural uranium metal in 1994 and its subsequent transfer for use in laser enrichment experiments, including the production of enriched uranium, the loss of nuclear material during these operations, and the production and transfer of resulting waste;

  (iii) the production of UO_2, UO_3, UF_4, UF_6 and AUC from imported depleted UO_2, depleted U_3O_8 and natural U_3O_8, and the production and transfer of resulting wastes;

  (iv) the production of UO_2 targets at ENTC and their irradiation in TRR, the subsequent processing of those targets, including the separation of plutonium, the production and transfer of resulting waste, and the storage of unprocessed irradiated targets at TNRC;

(b) Failure to provide design information for:

  (i) the centrifuge testing facility at the Kalaye Electric Company;

  (ii) the laser laboratories at TNRC and Lashkar Ab'ad, and locations where resulting wastes were processed and stored, including the waste storage facility at Karaj;

  (iii) the facilities at ENTC and TNRC involved in the production of UO_2, UO_3, UF_4, UF_6 and AUC;

  (iv) TRR, with respect to the irradiation of uranium targets, and the hot cell facility where the plutonium separation took place, as well as the waste handling facility at TNRC; and

(c) Failure on many occasions to co-operate to facilitate the implementation of safeguards, through concealment.

49. As corrective actions, Iran has undertaken to submit ICRs relevant to all of these activities, to provide design information with respect to the facilities where those activities took place, to present all nuclear material for Agency verification during its forthcoming inspections and to implement a policy of co-operation and full transparency.

E. Assessment and Next Steps

50. The recent disclosures by Iran about its nuclear programme clearly show that, in the past, Iran had concealed many aspects of its nuclear activities, with resultant breaches of its obligation to comply with the provisions of the Safeguards Agreement. Iran's policy of concealment continued until last month, with co-operation being limited and reactive, and information being slow in coming, changing and contradictory. While most of the breaches identified to date have involved limited quantities of nuclear material, they have dealt with the most sensitive aspects of the nuclear fuel cycle, including enrichment and reprocessing. And although the materials would require further processing before being suitable for weapons purposes, the number of failures by Iran to report in a timely manner the material, facilities and activities in question as it is obliged to do pursuant to its Safeguards Agreement has given rise to serious concerns.

51. Following the Board's adoption of resolution GOV/2003/69, the Government of Iran informed the Director General that it had now adopted a policy of full disclosure and had decided to provide the Agency with a full picture of all of its nuclear activities. Since that time, Iran has shown active co-operation and openness. This is evidenced, in particular, by Iran's granting to the Agency unrestricted access to all locations the Agency requested to visit, by the provision of information and clarifications in relation to the origin of imported equipment and components, and by making individuals available for interviews. This is a welcome development.

52. The Agency will now undertake all the steps necessary to confirm that the information provided by Iran on its past and present nuclear activities is correct and complete. To date, there is no evidence that the previously undeclared nuclear material and activities referred to above were related to a nuclear weapons programme. However, given Iran's past pattern of concealment, it will take some time before the Agency is able to conclude that Iran's nuclear programme is exclusively for peaceful purposes. To that end, the Agency must have a particularly robust verification system in place. An Additional Protocol, coupled with a policy of full transparency and openness on the part of Iran, is indispensable for such a system.

53. In that context, Iran has been requested to continue its policy of active co-operation by answering all of the Agency's questions, and by providing the Agency with access to all locations, information and individuals deemed necessary by the Agency. One issue requiring investigation as a matter of urgency is the source of HEU and LEU contamination. The Agency intends to pursue the matter with a number of countries, whose full co-operation is essential to the resolution of this issue.

54. The recent announcement of Iran's intention to conclude an Additional Protocol, and to act in accordance with the provisions of the Protocol pending its entry into force, is a positive development. The draft Additional Protocol is now being submitted to the Board for its consideration.

55. Iran's decision to suspend its uranium enrichment related and reprocessing activities is also welcome.[7] The Agency intends to verify, in the context of the Safeguards Agreement and the Additional Protocol, the implementation by Iran of this decision.

56. The Director General will inform the Board of additional developments for its further consideration at the March 2004 meeting of the Board, or earlier, as appropriate.

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[7] It should be noted that Iran introduced UF_6 into the first centrifuge at PFEP on 25 June 2003, and, on 19 August 2003, began testing a small ten machine cascade. On 31 October 2003, Agency inspectors observed that no UF_6 gas was being fed into the centrifuges, although construction and installation work at the site was continuing.

DETAILED TECHNICAL CHRONOLOGY

Uranium Conversion

The Uranium Conversion Facility (UCF)

1. According to Iran, UCF was originally based on a design provided by a foreign supplier in the mid-1990s. The plant was supposed to have been constructed by the supplier under a turnkey contract, but the contract was cancelled in 1997 and, according to Iran, the supplier did not provide any equipment to Iran. The AEOI has acknowledged having received from the supplier the blueprint of the facility, including equipment test reports and some design information on the equipment, but has stated that all the parts and equipment for the plant were manufactured domestically based on detailed designs developed without external assistance. Construction of the plant was begun in 1999.

2. Preliminary design information on UCF was submitted to the Agency on 31 July 2000. The Agency has performed DIV at UCF since then on a regular basis with a view to monitoring progress in construction and equipment installation, and to develop a safeguards approach. The proposed safeguards approach was given to the Iranian authorities in February 2002.

3. The design information provided to the Agency in July 2000 described the purpose of this facility as the conversion of uranium ore concentrate (UOC or U_3O_8) into natural UO_2, UF_6 and uranium metal. The production design capacity was said to be 200 t of UF_6 annually. The facility was described as having the following process lines: conversion of natural UOC into UF_6; conversion of low enriched UF_6 into UO_2 (30 t per year of UO_2 enriched to 5% U-235); conversion of depleted UF_6 to UF_4 (170 t per year of depleted UO_4); conversion of low enriched UF_6 LEU metal (30 kg per year of uranium metal enriched to 19.7% U-235), and the conversion of depleted UF_4 to depleted uranium metal. According to information provided by Iran, commissioning of the first line (for the conversion of U_3O_8 to ammonium uranyl carbonate (AUC)) is expected to begin in November 2003.

4. While conducting a DIV at the facility in 2002, inspectors noticed that the depleted uranium metal line had been changed to a line for natural uranium metal production. The updated design information, which was provided to the Agency on 9 April 2003, now includes an additional line for conversion to natural UO_2 and a line for conversion to natural uranium metal. In a letter dated 19 August 2003, Iran stated that the uranium metal production line could be used to produce shielding material, and that the natural UO_2 line was envisaged to meet the needs of the heavy water reactor programme.

Uranium Conversion Experiments and Testing

5. The explanations by Iran that it had not conducted any tests using nuclear material on certain parts of the conversion process and that those processes had been based on the supplier's drawings and test reports, raised questions, particularly given that the simpler steps of the conversion process (such as U_3O_8 dissolution and uranium purification using pulse columns) had undergone extensive testing. According to Agency experts, such an approach would be inconsistent with the normal practice of first validating the processes and carrying out pilot scale production before proceeding to the final design and construction of a commercial conversion plant.

6. As indicated in GOV/2003/63, Iran acknowledged in August 2003 that it had carried out some bench scale uranium conversion experiments in the early 1990s, experiments that Iran should have reported in accordance with its obligations under the Safeguards Agreement.

7. On 9 October 2003, the Agency received acknowledgement that, contrary to Iran's previous communications, practically all of the materials important to uranium conversion (AUC, UO_3, UF_4 and UF_6) had been produced in laboratory and bench scale experiments (kilogram quantities) conducted between 1981 and 1993 without having been reported to the Agency. On 1 November 2003, Iran explained that, due to foreign involvement in the design and construction of UCF, it was decided in 1993 to terminate domestic research and development on UF_4 and UF_6. Iran further explained that the facilities related to the UF_4 and UF_6 experiments had been dismantled, and that the equipment had been moved to waste storage at Karaj. This is being evaluated by the Agency.

8. For ease of reference, a summary of major processing experiments by Iran using imported uranium, based on information currently available to the Agency, is provided in Table 1.

TABLE 1: Major Processing Experiments by Iran Using Imported Uranium

Year of Import	Material Type & Quantity	Use by Iran
1977	20 kg U_3O_8 (depleted)	• At Iran's request the U_3O_8 was exempted from safeguards in 1978 (de-exempted in 1998). • Processing activities were carried out between 1981 and 1993 and reported to the Agency in 1998. 5.2 kg U_3O_8 was declared a process loss from the experiments.
	50 kg UO_2 (depleted)	• At Iran's request the UO_2 was exempted from safeguards in 1978 (de-exempted in 1998). • Fuel fabrication research was carried out between 1985 and 1993 at FFL and reported to the Agency in 1998; 13.1 kg depleted UO_2 was declared as a process loss from these experiments. • Lab-scale experiments using UO_2, reported in 1998 as a loss, were used between 1989 and 1993 to produce UF_4 at TNRC. • UO_2 targets were produced from 1988 to 1992 at ENTC using about 6.9 kg UO_2, previously declared as a process loss in 1998, subsequently irradiated at TRR; the resulting plutonium separated at TNRC was stored together with the irradiated unprocessed targets at TNRC.
1982	531 t U_3O_8 concentrate (natural)	• Processing of 85 kg U_3O_8 between 1982 and 1993 was carried out at UCL and reported to the Agency in 1998; 45 kg was declared as a process loss from these experiments. • Between 1982 and 1987 about 12.2 kg UO_2 was produced using U_3O_8 declared in 1998 as a loss. This UO_2, combined with some other materials, was used between 1989 and 1993 to produce about 10 kg UF_4 at TNRC.
1991	1005 kg UF_6 (natural)	• 1.9 kg UF_6 was used for testing of centrifuges at Kalaye Electric between 1999 and 2002.
	402 kg UF_4 (natural)	• 376.6 kg UF_4 was converted to U metal in 113 experiments at JHL, and about 9.4 kg UF_4, which had been declared earlier in 2003 as a process loss, was used to produce 6.5 kg UF_6 at TNRC between 1991 and 1993.
	401.5 kg UO_2 (natural)	• 44 kg UO_2 was used in testing of pulse columns and pellet production at JHL. • 1-2 g UO_2 was irradiated in experiments in TRR and processed at JHL. • 2.7 kg UO_2 was used to produce UF_4.
1993	50 kg uranium metal	• 8 kg uranium metal was used for AVLIS experiments from 1999 to 2000 at TNRC. • 22 kg uranium metal was used for AVLIS experiments from October 2002 to February 2003 at Lashkar Ab'ad.

9. In 1977, Iran imported 20 kg of depleted U_3O_8 and 50 kg of depleted UO_2. Upon request by Iran in 1978, these materials were exempted from safeguards. In 1982, Iran imported 531 t of natural U_3O_8 concentrate, which it reported to the Agency in 1990.

10. In 1981 and 1984, respectively, Iran commissioned with a foreign supplier the construction at ENTC of a Uranium Chemistry Laboratory (UCL) and a Fuel Fabrication Laboratory (FFL). The existence of these laboratories was disclosed to the Agency during a visit of the then DDG-SG in 1993, and formally reported to the Agency in 1998. Between 1981 and 1993, Iran carried out at UCL and FFL unreported activities involving the exempted depleted U_3O_8, the exempted depleted UO_2, and the U_3O_8 concentrate (see paras. 11 and 12 below). These activities were only reported to the Agency in 1998 after lengthy discussions between the Agency and Iranian officials. The material was de-exempted in 1998, and what remained of it was stored at ENTC. In 1998, Iran declared that UCL had been closed down since 1987. FFL is still in operation.

11. Between 1981 and 1993, processing activities involving the 20 kg of exempted depleted U_3O_8 and some of the 531 t of natural U_3O_8 concentrate were carried out at UCL. Of the original 20 kg of depleted U_3O_8, 5.2 kg was reported in 1998 as process losses by Iran. Iran also reported in 1998 that it had processed 85 kg of the 531 t of U_3O_8 concentrate, of which 45 kg was declared as process losses.

12. During the period 1985 through 1993, FFL was used for research in fuel fabrication, the main activity having been the manufacture of sintered pellets using the imported 50 kg of exempted depleted UO_2. Iran reported the existence of FFL, and the processing of the nuclear material there, in 1998, at which time it declared that 13.1 kg of the material had been lost during processing.

13. In a letter dated 19 August 2003, Iran acknowledged that it had carried out UO_2 to UF_4 conversion experiments on a laboratory scale during the 1990s at the Radiochemistry Laboratories of the TNRC using some of the imported depleted UO_2 referred to in the previous paragraph. Until August 2003, Iran had claimed that it had carried out no UF_4 production experiments. This activity was acknowledged by Iran only after the July 2003 waste analysis results of samples taken to verify experiments using nuclear material imported in 1991 indicated the presence of depleted UF_4 mixed with natural UF_4. Iran acknowledged that the UO_2 which had been used had been part of that previously declared by Iran as having been lost during experiments at FFL.

14. On 9 October 2003, Iran provided further details on these UF_4 experiments, stating that, between 1987 and 1993, there had been bench scale production of UF_4 at the Radiochemistry Laboratories. This information was further amplified in Iran's letter dated 21 October 2003 and in a subsequent meeting on 1 November 2003. According to that information, the UF_4 production experiments included testing of wet and dry production methods. Between 1982 and 1987, approximately 12.2 kg of natural UO_2 was produced at UCL using imported U_3O_8 concentrate that had been reported as a process loss in 1998 (see para. 11 above). This material, together with 1 kg of the UO_2 imported in 1991, and 1.23 kg of depleted UO_2 that had been reported in 1998 as a process loss at UCL (see para. 12 above), was used for the production of UF_4 at the Radiochemistry Laboratories through the wet method. In addition, 2.5 kg of UF_4 was produced with the dry method, using UO_2 imported in 1991 as the source material.

15. Between 1991 and 1992, 0.2 kg of UO_3 and 4.45 kg of AUC were produced in the Radiochemistry Laboratories using, as source material, some of the U_3O_8 concentrate imported in 1982.

16. On 1 November 2003, Iran agreed, as a corrective measure, to submit ICRs for UCL, FFL, JHL and the waste storage facility at Karaj, as well as design information for the waste storage facility.

17. Final evaluation of the information provided on these conversion experiments will depend on the results of the destructive and environmental sample analysis and the assessment of the experiment reports provided by Iran.

18. Following the import in 1991 of natural uranium (1005 kg of UF_6, 402 kg of UF_4 and 401.5 kg of UO_2), Iran carried out a number of experiments, on a laboratory scale, at JHL located at TNRC. The import of the nuclear material in question was only acknowledged by Iran in March 2003. The status of the imported material, as currently declared, is as follows:

- Of the 1005 kg of UF_6, 1.9 kg was found to have been missing from two cylinders in which the material is said to have been delivered. This loss was originally attributed by Iran to evaporation of the material due to high temperatures during storage of the material. Iran has now acknowledged that it used that material for testing centrifuges at the Kalaye Electric Company, as described below.
- Of the 402 kg of UF_4, 376.6 kg was converted to uranium metal. The conversion was declared by Iran in March 2003, and in June 2003, it was described as having been achieved through 113 experiments carried out at JHL in the early 1990s. In October 2003, Iran also acknowledged having used 9.43 kg of the UF_4 for conversion to UF_6, as described below.
- Of the 401.5 kg of UO_2, 44 kg was used in testing pulse column process and pellet production experiments at JHL. In addition, between June 1987 and February 1999, small amounts (1 to 2 g) of UO_2 were irradiated in TRR in about 50 experiments and sent to the Molybdenum, Iodine and Xenon Radioisotope Production Facility (MIX Facility) for separation of I-131. In October 2003, Iran acknowledged having used 2.7 kg of the UO_2 in conversion experiments to produce UF_4.

19. Iran has provided ICRs on its import of the material referred to in the preceding paragraph, as well as on its subsequent processing. Iran has also submitted physical inventory listings (PILs) and material balance reports (MBRs) reflecting the current status of nuclear material at JHL, including uranium metal, uranyl nitrate, UO_2 pellets and waste containing uranium.

20. JHL, where many of these experiments are declared to have been carried out, consists of several rooms where conversion activities took place using the nuclear material imported in 1991. The facility was declared to the Agency in March 2003. In May 2003, design information for JHL was received, and verification thereof commenced. Iran has been informed that the design information is not yet complete, and has been requested to provide an update.

Production and use of UF_6

21. Until recently, the Iranian authorities repeatedly asserted that the UF_6 imported in 1991 had not been processed, and specifically that it had not been used in any centrifuge, enrichment or other tests. The State authorities explained that the small amount of UF_6 (1.9 kg) missing from the two smaller cylinders in which the material had been imported might have been due to leaking valves, an explanation challenged by the Agency on the basis of its technical assessment and verification activities. In the information submitted on 23 October 2003, however, Iran acknowledged that it had used 1.9 kg of the imported UF_6 to test centrifuge machines at the Kalaye Electric Company workshop between 1999 and 2002, before the dismantling of the test facility at the end of 2002. This material is currently declared as hold-up in the dismantled equipment currently stored at PFEP.

22. The remaining container of the UF_6 imported in 1991, a large 30 B-type cylinder currently stored at Natanz, was presented to Agency inspectors, and appeared to have been intact. However, destructive analysis sampling of its contents need to be performed. This will be done as soon as the

necessary equipment is installed. In the meantime, environmental samples and non-destructive measurements have been taken in order to confirm the presence of natural uranium.

23. In contrast to its earlier declarations that it had not used nuclear material to test the production of UF_6, Iran acknowledged in its letter dated 21 October 2003 that, between 1987 and 1993, it had carried out in the Radiochemical Laboratories at TNRC bench scale preparation of UF_6 using as feed 9.43 kg of the UF_4 which had been imported in 1991. The laboratory equipment has since then been dismantled. On 12 October 2003, the equipment was presented for Agency verification in a container at the Karaj Nuclear Research Centre for Medicine and Agriculture, together with a number of cylinders containing approximately 6.5 kg of UF_6. Final evaluation will depend on the results of environmental sampling and assessment of experiment records provided by Iran.

24. On 1 November 2003, Iran agreed to submit ICRs for JHL, PFEP and the waste storage facility at Karaj and to provide design information for those facilities.

Production of uranium metal

25. In March 2003, Iran informed the Agency that most of the natural UF_4 imported in 1991 had been converted to uranium metal at JHL between 1995 and 2000 in the course of 113 experiments. Neither the experiments nor the facility where these experiments were conducted were declared to the Agency at the time the experiments were conducted. The nuclear material resulting from these experiments was verified by the Agency during its May 2003 inspection, and Iran has submitted the relevant ICRs, PILS and MBRs, as well as updated design information for JHL.

26. In its letter dated 21 October 2003, Iran admitted that the uranium metal production capabilities had also been intended for use in Iran's laser enrichment programme (see discussion below).

Reprocessing Experiments

27. In March 2003, Iran stated that some of the UO_2 imported in 1991 had been used for pellet fabrication experiments. In April 2003, Iran informed the Agency that some of the UO_2 had also been used in isotope production experiments involving irradiation at TRR of the *natural* UO_2 targets and the subsequent separation of molybdenum, xenon and iodine. The liquid uranium-containing waste resulting from these experiments is said by Iran to have been sent to Esfahan.

28. In its letter of 21 October 2003, Iran acknowledged the irradiation of *depleted* UO_2 targets at TRR and subsequent plutonium separation experiments in a hot cell in the Nuclear Safety Building of TNRC between 1988 and 1992. Neither the activities nor the separated plutonium had been reported to the Agency previously.

29. In the meetings held 27 October–1 November 2003, additional information was provided about the experiments involving the depleted uranium. Iran stated that they had been carried out to learn about the nuclear fuel cycle, and to gain experience in reprocessing chemistry. The experiments took place between 1988 and 1992, and involved 7 kg of pressed or sintered UO_2 pellets prepared at ENTC using depleted uranium that had been exempted, at the request of Iran, in 1978. In 1997, this material was reported as a process loss at FFL. The capsules containing the pellets were irradiated typically for two weeks in TRR in connection with a project to produce fission product isotopes of molybdenum, iodine and xenon. The plutonium separation, based on the Purex process, was carried out on the site of TNRC, on a laboratory scale, in three shielded glove boxes, which, according to Iran, were dismantled in 1992 and later stored in a warehouse at ENTC along with related equipment.

30. The Agency was informed that a total of about 7 kg of UO_2 was used, of which 3 kg had been irradiated and processed to separate plutonium. The remaining 4 kg of irradiated UO_2 targets was

placed in containers and stored on the TNRC site; the separated plutonium was stored in a laboratory of JHL following the dismantling of the glove boxes; and the wastes were disposed of at Qom.

31. In August 2003, Agency inspectors visited the waste storage location at Anarak where the waste referred to in paragraph 27 above had been stored. Iran has agreed to transfer that waste to JHL.

32. On 1 November 2003, Iran agreed to submit all nuclear material accountancy reports from 1988 through the present covering the manufacture of the UO_2 targets, their irradiation and subsequent processing and the storage of the remaining nuclear material and wastes. In addition, Iran has agreed to submit design information covering these activities and nuclear material at ENTC and JHL.

33. On 1 November 2003, Iran presented both the separated plutonium and the irradiated unprocessed targets to Agency inspectors at JHL. Verification of that material, as well as possible hold-up in dismantled glove boxes, is foreseen to take place during the forthcoming inspection.

Uranium Enrichment

Gas Centrifuge Enrichment

34. In February 2003, in response to inquiries by the Agency, Iran acknowledged the existence of two centrifuge enrichment plants under construction at Natanz: PFEP and the large commercial scale FEP. In February 2003, Iran also acknowledged that the workshop of the Kalaye Electric Company in Tehran had been used for the production of centrifuge components, but stated that there had been no operations in connection with its centrifuge enrichment development programme involving the use of nuclear material, either at the Kalaye Electric Company or at any other location in Iran. According to Iran, all testing had been carried out either in vacuum or using simulation studies. Iranian officials stated that the enrichment programme had been started in 1997 and that it was indigenous and based on information available from open sources, such as scientific publications and patents.

35. A team of Agency centrifuge technology experts met on 7–11 June 2003 with Iranian officials to seek clarification about Iran's centrifuge enrichment programme, in particular about its statement that the design and development, which was said to have been begun in 1997, had been based on information from open sources and extensive modelling and simulation, and that the tests of centrifuge rotors at the Amir Khabir University and on the premises of the AEOI in Tehran had been conducted without nuclear material. This meeting was followed by a round of technical discussions in Tehran in July 2003, and further meetings of the centrifuge technology experts with Iranian officials in Iran on 9–12 August 2003, 4–9 October 2003 and 27 October–1 November 2003.

36. Following up on recent open source reports of enrichment activities being undertaken at an industrial complex in Kolahdouz in western Tehran, the Agency was permitted on 5 October 2003 to visit three locations which the Agency had identified as corresponding to those mentioned in the reports. Iran stated that there were no nuclear related activities being carried out at this site. While no work was seen at those locations that could be linked to uranium enrichment, environmental samples were taken.

The Natanz Facilities

37. At the time Iran disclosed the construction of PFEP, in February 2003, over 100 of the approximately 1000 planned centrifuge casings had already been installed. Iran informed the Agency that the remaining centrifuges were scheduled to be installed by the end of 2003. Iran also informed the Agency that the commercial scale FEP, which is planned to contain over 50 000 centrifuges, was scheduled to start accepting centrifuges in early 2005, after the design is confirmed by the tests to be conducted in PFEP, but that FEP was not scheduled to receive nuclear material in the near future.

38. The Agency took baseline environmental samples at PFEP on several occasions between March and May 2003 before nuclear material was introduced in the facility, the results of which revealed particles of HEU indicating the possible presence in Iran of nuclear material that had not been declared to the Agency. In June 2003, the results were provided to Iran for comments. In August 2003, the Iranian authorities attributed the presence of HEU particles to contamination originating from centrifuge components that had been imported by Iran.

39. Subsequent environmental samples revealed the presence in Iran of natural uranium, LEU and at least two other types of HEU particles. It was also noted that there had been differences among the samples taken from the surfaces of the centrifuge casings installed for the single machine tests. The Agency asked the Iranian authorities to investigate whether there were differences in the manufacturing history of those pieces of equipment.

40. In August 2003, the IAEA was allowed to take swipe samples of imported components stored at Natanz, as well as of some of the newly machined components that had been produced in Iran. At the request of the Agency, Iran provided a list of imported and domestically produced centrifuge components and equipment in October 2003.

41. Agency inspectors were told in early October 2003 that all of the centrifuges from the Kalaye Electric Company had been scrapped, and therefore were not available for inspection, whereas it became clear later that the centrifuges had in fact been stored at another location in Tehran and were finally shown to the inspectors at Natanz on 30–31 October 2003, at which time Agency experts examined the centrifuges and associated equipment, and took environmental samples. All major imported and domestically produced components, as well as various pieces of manufacturing equipment have now been sampled. The results of the sample analyses are not expected to be available before December 2003. The nuclear material held in this equipment will be verified during the forthcoming inspections. The Agency has now also obtained information about the source of the components that Iran claims to have been contaminated.

42. On 25 June 2003, Iran introduced UF_6 into the first centrifuge at PFEP for the purpose of single machine testing. On 19 August 2003, Iran began the testing of a small ten-machine cascade at PFEP with UF_6. As of October 2003, some single machine testing using UF_6 had been carried out at PFEP and the installation of a 164-machine cascade was being finalized. Agency inspectors visited PFEP on 31 October 2003, and observed that no UF_6 gas was being fed into the first centrifuges of the 164-centrifuge machine cascade. However, construction and installation work at the site was continuing.

Kalaye Electric Company

43. In March 2003, during an Agency visit to the workshop at the Kalaye Electric Company, the Iranian authorities refused Agency access to one of the workshop buildings, claiming that the building was used for storage and that no keys to the building were available.

44. During their 9–12 August 2003 visit to Iran, Agency inspectors were permitted to take environmental samples at the Kalaye Electric Company workshop, with a view to assessing the role of that company in Iran's enrichment research and development programme. During that visit, the inspectors noted that there had been considerable modification of the premises since their visits in March and May 2003, which the Iranian authorities attributed to the transformation of the workshop from use as a storage facility to its use as a laboratory for non-destructive analysis. As reflected in the Director General's previous report to the Board, this could impact on the accuracy of the environmental sampling and the Agency's ability to verify Iran's declarations about the types of activities previously carried out there.

45. On 16 September 2003, the Agency informed representatives of Iran of the results of the analysis of the environmental samples taken at the Kalaye Electric Company in August 2003, which had revealed the presence of HEU and LEU particles which were not consistent with the nuclear material in the declared inventory of Iran.

46. In its letter of 21 October 2003, Iran acknowledged that "a limited number of tests, using small amounts of UF$_6$, [had been] conducted in 1999 and 2002" at the Kalaye Electric Company. The equipment used between 1999 and 2000 at Kalaye Electric Company was suitable for pilot scale uranium isotope separation. As an isotope separation plant is defined in Article 98.I.(a) of the Safeguards Agreement as a facility, the existence of this facility should have been declared to the Agency.

Enrichment research and development activities

47. As indicated in the Director General's previous report, in contrast to the initial information provided about the chronology of the enrichment programme and its indigenous nature, Iran informed the Agency in August 2003 that the decision to launch a centrifuge enrichment programme had actually been taken in 1985, and that Iran had received drawings of the centrifuge through a foreign intermediary around 1987. Iranian officials further described the programme as having consisted of three phases: the first phase, from 1985 until 1997, during which related activities had been located mainly at the AEOI premises in Tehran (with laboratory work at the Plasma Physics Laboratories of TNRC); the second phase, between 1997 and 2002, during which the activities had been relocated and concentrated at the Kalaye Electric Company in Tehran and Iran was able to make all components had some success in mechanically testing centrifuges and decided to construct the enrichment facilities at Natanz; and the third phase, 2002 to the present, when the research and development and assembly activities were moved to Natanz.

48. According to information provided by Iran in August 2003, during the first phase, about 2000 components and some subassemblies had been obtained from abroad through foreign intermediaries or directly by Iranian entities, but no help was received from abroad in the assembly of centrifuges or in training, nor were any completed centrifuges imported. Efforts had been concentrated on achieving an operating centrifuge, but many difficulties were encountered as a result of machine crashes attributed to poor quality components. Iran described the second phase of activities as having involved the assembly and testing of centrifuges, but again without inert (e.g. xenon) or UF$_6$ gas.

49. In pursuit of its verification of Iran's statement that it had not tested any centrifuges using nuclear material, the Agency's team of centrifuge technology experts inquired of Iran how it had developed the 'enrichment factor'[4] and 'separative output'[5] used in the relevant calculations. The Agency was

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[4] The "enrichment factor" of a centrifuge is the ratio of the amount of U-235 in the product to the amount of U-235 in the feed.

told that they had been obtained from an original centrifuge 'sketch', supported by theoretical calculations using open literature, and not from experiments.

50. The Agency's centrifuge technology experts remained of the view that, based on all information available to them, Iran's assertion that no UF_6 or any simulation gas had ever been introduced into a centrifuge machine in Iran was inconsistent with other countries' experience, and they still could not conclude that the then current status of the centrifuges installed at Natanz could have been achieved solely on the basis of open source information and computer simulations without additional confirmation through the use of UF_6 in laboratory testing.

51. No new information was provided by Iran with respect to the issue of testing of centrifuges using nuclear material until October 2003. In its letter of 21 October 2003, Iran acknowledged that, in order to ensure the performance of centrifuge machines, a limited number of tests using small amounts of UF_6 imported in 1991 had been carried out at the Kalaye Electric Company. According to Iran, the first test of the centrifuges was conducted in 1998 using an inert gas (xenon). Series of tests using UF_6 were performed between 1999 and 2002. In the course of the last series of tests, an enrichment level of 1.2% U-235 was achieved.

52. In a meeting with enrichment technology experts held during the 27 October–1 November 2003 visit, Iran provided additional information about its gas centrifuge programme. The authorities explained that the experiments which had been carried out at the Kalaye Electric Company had involved the 1.9 kg of imported UF_6, the absence of which the State authorities had earlier attributed to evaporation due to leaking valves on the cylinders containing the gas. The individual who had been in charge of the actual research and development work during the period 1992–2001 was made available for discussions with the Agency. Although there were no detailed technical or nuclear material accountancy reports available, the individual interviewed by the Agency was able to provide, as supporting documentation, his personal notebooks.

53. On 1 November 2003, the Iranian authorities stated that all nuclear material had been declared to the Agency and that Iran had not enriched uranium beyond 1.2% U-235 using centrifuges, and that, therefore, the contamination could not have arisen as a result of indigenous activities. In the course of these investigations and interviews of individuals involved in the nuclear programme, the Agency has obtained information on the origin of the centrifuge components and equipment which Iran claims to be the source of HEU, LEU and other particle contamination at the Kalaye Electric Company and at PFEP. The Agency will continue to investigate this matter.

54. As a corrective measure, Iran has agreed to submit ICRs for JHL and for PFEP, and to provide updated design information for PFEP.

Laser Enrichment

55. During the Agency's 12 August 2003 visit to the laser laboratory located at Lashkar Ab'ad, the Iranian authorities described the laboratory as originally having been devoted to laser fusion research and laser spectroscopy, but stated that its focus had been changed and the equipment unrelated to the site's current projects, including a large vacuum vessel imported by Iran in 2000, had been moved. The Agency requested that Iran confirm that there had not been in the past any activities related to uranium laser enrichment at this location or at any other location in Iran, and requested permission to take environmental samples at the laboratory.

The "separative output" of a centrifuge defines the amount of enrichment achieved by the centrifuge. The "separative output" multiplied by the number of centrifuges in an enrichment plant defines the total output achievable by the plant.

56. In response to that request, in its 19 August 2003 letter to the Agency, Iran stated that, in the past, apart from planned co-operation in laser fusion and laser spectroscopy which never materialized, there had been a research thesis on laser spectroscopy of SF_6 prepared by a university student in co-operation with the laser division of AEOI. As indicated in the Director General's previous report to the Board, Iran stated that it had a substantial research and development programme on lasers, but that it currently had no programme for laser isotope separation.

57. During discussions which took place in Iran from 2 to 3 October 2003, the Iranian authorities informed Agency inspectors that Iran had received from a foreign source, in 1992, a laser spectroscopy laboratory intended for the study of laser induced fusion, optogalvanic phenomena and photoionization spectroscopy, and from another foreign source, in 2000, the large vacuum vessel referred to above, but that the equipment had been only for spectroscopic studies. It was agreed that the Agency would be shown the equipment and permitted to take environmental samples, as had been requested by the Agency on 12 August 2003.

58. On 6 October 2003, Agency inspectors were permitted to take environmental samples at Lashkar Ab'ad. The inspectors also visited a warehouse in the Karaj Agricultural and Medical Centre of the AEOI, where a large imported vacuum vessel (approximately 5 m long, 1 m in diameter) with associated hardware were stored. The Iranian authorities stated that it was the equipment which had been imported in 2000, that it had never been used, and that it had now been packed for shipment back to the manufacturer, since the contract related to its supply had been terminated by the foreign partner in 2000. The inspectors were informed that the individuals involved with the projects would be made available for interviews, but that the interviews would take place later in Tehran, where the equipment related to the laboratory imported from another country in 1992 would be made available for examination and environmental sampling. However, these interviews and the presentation of the other equipment were deferred by Iran until the end of October 2003.

59. In its letter dated 21 October 2003, Iran acknowledged that, starting in the 1970s, it had had contracts related to laser enrichment using atomic vapour laser isotope separation (AVLIS) and molecular laser isotope separation (MLIS) techniques with foreign entities from four countries:

(a) 1975 – a contract for the establishment of a laboratory to study the spectroscopic behaviour of uranium metal, which had been abandoned in the 1980s as the laboratory had not functioned properly. The laboratory had also contained two mass spectrometers, purchased from the same source in 1976, which had been used to analyse samples of nuclear material obtained from enrichment experiments at Kalaye Electric Company, TNRC and Lashkar Ab'ad. While the import of the nuclear material used in that project had been reported to the Agency, the laboratory where the laser equipment had been installed (at TNRC) was not. None of these activities involving the nuclear material had been reported to the Agency.

(b) Late 1970s – a contract with a second supplier to study MLIS, under which four 5 µm CO lasers and four vacuum chambers were delivered, but which was ultimately terminated due to the political situation prevailing at that time.

(c) 1991 – a contract with a third supplier for the establishment of a laser laboratory, consisting of two parts: the "Laser Spectroscopy Laboratory" (LSL), for the spectroscopic study of uranium metal, and the "Comprehensive Separation Laboratory" (CSL), at which enrichment would be carried out on a milligram scale. The contract also provided for the supply to Iran of 50 kg of natural uranium metal (which was imported in 1993). The equipment was able to enrich uranium up to the contracted level of 3% U-235, and even slightly beyond, in the course of the experiments. It was used until October 2002, when the laboratories, and the nuclear material, were moved from TNRC to Lashkar Ab'ad. None of these activities involving nuclear material were reported to the Agency.

(d) 1998 – a contract with a fourth supplier to obtain information related to laser enrichment, and the supply of relevant equipment. However, due to the inability of the supplier to secure export licences, only some of the equipment was delivered (to Lashkar Ab'ad).

60. The equipment imported in connection with the above mentioned AVLIS and MLIS projects was presented to the Agency inspectors in October 2003, and the inspectors were able to discuss the projects with individuals who had been involved with them and to take environmental samples. Final assessment must await evaluation of the recently available information and the environmental sampling results.

61. In October 2003, Iran provided more information on Lashkar Ab'ad, and acknowledged that it had in fact contained a pilot plant for laser enrichment using AVLIS techniques, which had been established in 2000 pursuant to a project involving the fourth country. As indicated above, this contract was not fully implemented, since export licences were not obtained for all of the equipment. The project had consisted of several contracts covering not only the supply of information, as indicated in Iran's letter of 21 October 2003 to the Agency, but also delivery of more powerful copper vapour lasers (CVLs) up to 150 kW. Since the delivery of the CVLs was blocked due to the lack of export licences, the equipment at LSL and CSL was moved to Lashkar Ab'ad in October 2002, and, taking advantage of the CVL and dye lasers from these laboratories and the large vacuum chamber and associated equipment imported in 2000 and already located there, experiments were conducted from October 2002 through January 2003 using 22 kg of the 50 kg of imported natural uranium metal. According to Iranian authorities, the uranium metal was located at Lashkar Ab'ad from December 2002 through May 2003. The equipment was dismantled in May 2003 and transferred together with uranium metal to Karaj, where they were presented to Agency inspectors on 28 October 2003. The Agency took environmental samples from the equipment and nuclear material presented to it.

62. In its letter of 21 October 2003, Iran also informed the Agency that it had used for separation experiments at LSL and CSL at TNRC 8 kg of the 50 kg of natural uranium metal imported in 1993.

63. The equipment received in 1992 and 1999 was suitable for pilot plant scale operations of uranium isotope separation using AVLIS. As an isotope separation plant is defined in Article 98.I.(a) of the Safeguards Agreement as a facility, the existence of these facilities should have been declared to the Agency, and information provided on an as-built basis at Lashkar Ab'ad, and its subsequent transfer to Karaj.

64. Iran had failed to report the receipt and use of uranium metal and to provide design information for LSL, CSL and Lashkar Ab'ad. In the meeting of 1 November 2003, Iran agreed, as a corrective measure, to submit the relevant ICRs concerning the use of the uranium metal, which will be presented for Agency verification during the inspection scheduled for 8–15 November 2003. Iran also agreed to submit design information for a new storage facility at Karaj, where the waste from the laser enrichment programme is being stored along with the dismantled equipment, and to amend the design information for JHL to cover the mass spectrometer and laser laboratories as well as some waste tanks containing nuclear material.

65. Final assessment is pending evaluation of the new information, the verification results from the November 2003 inspection and the results of environmental and other sample taking.

Heavy Water Reactor Programme

66. In response to Agency enquiries in September 2002, Iran confirmed in February 2003 its construction of a Heavy Water Production Plant at Arak. In explaining the need for such a plant, Iranian officials said that they had not known whether their uranium enrichment programme would succeed, and that, therefore, they had considered in the 1980s the possibility of constructing a natural uranium nuclear power plant using heavy water as the moderator and coolant. They further explained that, now that the enrichment programme had succeeded, there was no need for heavy water production, and they were not sure whether the plant would be completed. On 26 February 2003, the Agency submitted a number of questions to Iran about its heavy water reactor programme, requesting that it provide further information, in particular on any plans Iran had to build heavy water reactors.

Design and Purpose of the IR-40

67. The Agency was first informed of Iran's construction of a heavy water reactor in a letter from Iran dated 5 May 2003. In that letter, Iran stated that it intended to construct a 40 MW(th) heavy water reactor, the Iran Nuclear Research Reactor (IR-40) at Arak. Enclosed with the letter was only preliminary design information on the reactor, in which the reactor power output of 40 MW(th) was confirmed; it did not include information on the fuel or the reactor design. At the same time, Iran provided preliminary information on a facility intended to manufacture fuel for IR-40, namely the Fuel Manufacturing Plant (FMP) to be built on the Esfahan site.

68. During a technical visit to Iran by the Agency on 10–13 July 2003, the Iranian authorities made a presentation on some of the technical features of the IR-40, and informed the Agency that the construction was planned to start in 2004. According to statements made in the course of this presentation, Iran had decided to replace TRR because, after 35 years of operation, it was reaching the safety limits for which it had been designed and because of its location within what had become the suburbs of the city of Tehran. However, as it had tried, unsuccessfully, on several occasions to import a research reactor suitable for medical, industrial isotope production and for research and development, Iran had decided in the mid-1980s to construct its own reactor. The only alternative was a heavy water reactor which could use UO_2 and zirconium produced in Esfahan. According to the Iranian authorities, to meet its isotope production requirements, such a reactor should have a neutron flux of 10^{13} to 10^{14} n/cm^2/s, based on a power of the order of 30-40 MW(th) when using natural UO_2 fuel.

69. During the presentation, the Iranian authorities informed the Agency that the facility was based on indigenous design, and that it was currently in the detailed design phase and would be built in the Khondab area near Arak. The core fuel assemblies would be made from natural UO_2 and supplied by FMP, the feed for which would be supplied by UCF, currently under construction at Esfahan. The Agency was informed that the construction of FMP would begin in 2003 and be completed in 2006, and that operations were planned to start in 2007. Iran provided updated design information on the IR-40 on 26 July 2003, and preliminary design information on FMP in 2003.

70. In a letter to the Agency dated 19 August 2003, the AEOI provided more information on Iran's heavy water reactor programme, stating that a decision to start the research and development had been made in the early 1980s.

71. As indicated above, Iran previously stated that the IR-40 was of indigenous design. According to the information provided by Iran in its letter of 21 October 2003, however, foreign experts had been consulted in the development of some parts of the design of the reactor. When asked, Iranian

authorities stated that they had conducted extensive reactor core calculations for the fuel management strategies and to control the excess reactivity[6] of the core. In that letter, Iran stated further that the reactor design had been 90% completed by the end of 2002, and the detailed design was expected to be completed by the end of 2005.

72. On 29 October 2003, Iran informed the Agency that the production of both "short lived" and "long lived" isotopes had been considered for this project, and that the exact amount and type of these isotopes would be decided upon during the detailed design stage of the project.

Hot Cells

73. During its July 2003 visit to Tehran, the Agency was provided with drawings of the reactor. Contrary to what would have been expected given the declared radioisotope production purpose of the facility, the drawings contained no references to hot cells. The Agency raised this issue during that visit, particularly in light of open source reports of recent efforts by Iran to acquire from abroad heavy manipulators and leaded windows designed for hot cell applications. The Agency indicated to the Iranian authorities that, given the specifications of the manipulators and windows which were the subject of those reports, a design for hot cells should exist already and that, therefore, the hot cell, or cells, should already have been declared, at least on a preliminary basis, as part of the facility or as a separate installation. On 4 August 2003, the Agency was provided with updated design information on the IR-40 which did not contain any references to hot cells. Later in August, Iran informed the Agency that, as Iran had not been certain about the success of its procurement efforts, the design of the hot cell(s) had not been included in the preliminary drawings of the IR-40 Research Reactor.

74. In its letter of 21 October 2003, Iran acknowledged that two hot cells had been foreseen for this project. However, according to the information provided in that letter, neither the design nor detailed information about the dimensions or the actual layout of the hot cells were available at the present time, since they did not know the characteristics of the manipulators and shielded windows for the hot cells which they could procure. Iran indicated in that letter that manipulators would be needed for: 4 hot cells for the production of medical radioisotopes, 2 hot cells for the production of Co-60 and Ir-192 sources, 3 hot cells for waste processing, and 10 back-up manipulators. The 21 October 2003 letter included a drawing of a building which Iran said would contain hot cells for the production of isotopes. In the meeting on 1 November 2003, upon further Agency inquiry, Iran confirmed that there were tentative plans to construct at the Arak site an additional building with hot cells for the production of radioisotopes. Iran stated that that first building was to contain hot cells for the production of "short lived" isotopes, and that it intended to construct the other building to produce "long lived" radioisotopes. Iran agreed to provide preliminary design information for the second building.

75. Agency experts will examine in detail all of the available information with a view to making a technical assessment of the explanations provided by Iran concerning the prospective use of the hot cells at Arak and the associated equipment and manipulators.

Heavy water production capacity and inventory

76. According to Iranian statements, the estimated annual need for heavy water at the IR-40 is less than 1 t. In a 19 August 2003 letter to the Agency, Iran provided additional information on the amount of heavy water initially needed for the reactor (approximately 80–90 t), and on the design capacity of

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[6] Excess reactivity is the maximum deviation from criticality attainable at any time by adjustment of the reactor's control rods.

the heavy water production plant under construction at Khondab near Arak (8 t of heavy water per year with expansion capabilities to twice its design capacity). According to the information provided in that letter, Iran plans to start the production of heavy water in 2004. In that letter, Iran stated further that laboratory scale experiments to produce heavy water had been conducted in Esfahan in the 1980s using electrolysis techniques.

77. In a meeting held on 29 October 2003, Iran confirmed that the construction of a second production line, with a production capacity of 8 t, had been started. It was further stated that the Khondab facility was actually a pilot plant, and that no laboratory or other experiments using the Girdler-Sulphide method (to be used at the Arak facility) had been carried out in the past in Iran.

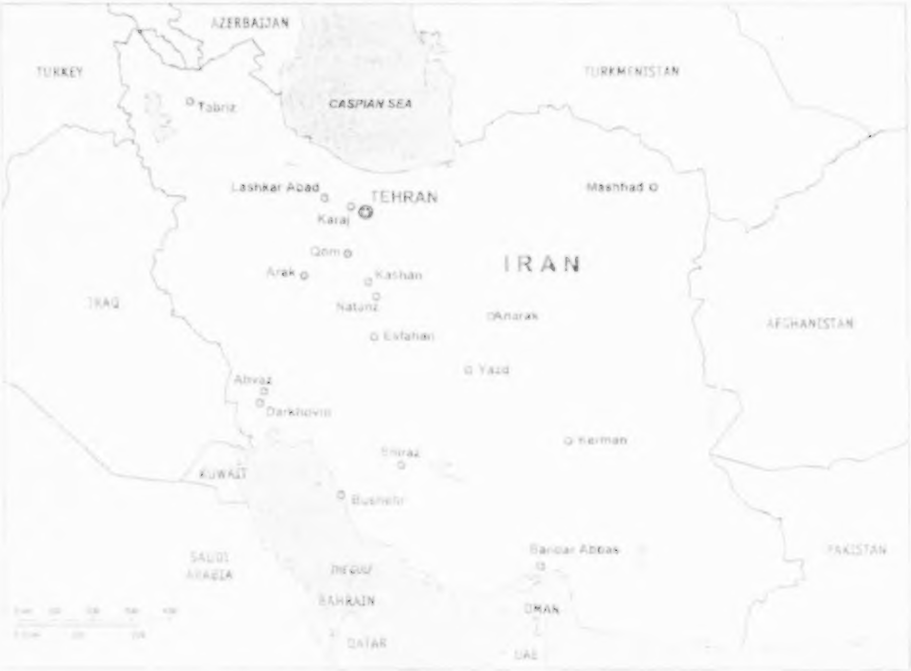
LIST OF LOCATIONS RELEVANT TO THE IMPLEMENTATION OF AGENCY SAFEGUARDS

LOCATION	AS OF NOVEMBER 2003	STATUS
TEHRAN NUCLEAR RESEARCH CENTRE	Tehran Research Reactor (TRR)	Operating
	Molybdenum, Iodine and Xenon Radioisotope Production Facility (MIX Facility)	Constructed, but not operating
	*Jabr Ibn Hayan Multipurpose Laboratories (JHL)	Operating
	*Waste Handling Facility (WHF)	Operating
TEHRAN	*Kalaye Electric Company	Dismantled pilot enrichment facility
BUSHEHR	Bushehr Nuclear Power Plant (BNPP)	Under construction
ESFAHAN NUCLEAR TECHNOLOGY CENTRE	Miniature Neutron Source Reactor (MNSR)	Operating
	Light Water Sub-Critical Reactor (LWSCR)	Operating
	Heavy Water Zero Power Reactor (HWSPR)	Operating
	Fuel Fabrication Laboratory (FFL)	Operating
	Uranium Chemistry Laboratory (UCL)	Closed down
	Uranium Conversion Facility (UCF)	Under construction, first process units being commissioned for operation
	Graphite Sub-Critical Reactor (GSCR)	Decommissioned
	*Fuel Manufacturing Plant (FMP)	In detailed design stage, construction to begin in 2004
NATANZ	*Pilot Fuel Enrichment Plant (PFEP)	Operating
	*Fuel Enrichment Plant (FEP)	Under construction

KARAJ	*Radioactive Waste Storage	Under construction, but partially operating
LASHKAR AB'AD	*Pilot Uranium Laser Enrichment Plant	Dismantled
ARAK	*Iran Nuclear Research Reactor (IR-40)	In detailed design phase
	*Hot cell facility for production of radioisotopes	In preliminary design stage
	*Heavy Water Production Plant (HWPP)	Under construction Not subject to Safeguards Agreement
ANARAK	*Waste storage site	Waste to be transferred to JHL

* Locations declared in 2003

MAP OF IRAN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TURKMENISTAN
Tabriz
CASPIAN SEA
Lashkar Abad
TEHRAN
Karaj
Mashhad
Qom
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Arak
Kashan
Natanz
IRAQ
Anarak
AFGHANISTAN
Esfahan
Yazd
Ahvaz
Darkhovin
Kerman
Shiraz
KUWAIT
Bushehr
SAUDI
ARABIA
Bandar Abbas
PAKISTAN
THE GULF
BAHRAIN
OMAN
QATAR
UAE

ABBREVIATIONS AND TERMS

AEOI	Atomic Energy Organisation of Iran
AUC	ammonium uranyl carbonate
AVLIS	atomic vapour laser isotope separation
BNPP	Bushehr Nuclear Power Plant, Bushehr
CO	carbon monoxide
CSL	Comprehensive Separation Laboratory, TNRC and Lashkar Ab'ad
CVL	copper vapour laser
DIV	design information verification
ENTC	Esfahan Nuclear Technology Centre
FEP	Fuel Enrichment Plant, Natanz
FFL	Fuel Fabrication Laboratory, ENTC
FMP	Fuel Manufacturing Plant, ENTC
GSCR	Graphite, Sub-Critical Reactor, ENTC
HEU	high enriched uranium
HWPP	Heavy Water Production Plant, Arak
HWSPR	Heavy Water Zero Power Reactor, ENTC
ICR	inventory change report
IR-40	Iran Nuclear Research Reactor, Arak
JHL	Jabr Ibn Hayan Multipurpose Laboratories, TNRC
LEU	low enriched uranium
LSL	Laser Separation Laboratory, TNRC and Lashkar Ab'ad
LWSCR	Light Water Sub-Critical Reactor, ENTC
MBR	material balance report
MIX Facility	Molybdenum, Iodine and Xenon Radioisotope Facility, TNRC
MLIS	molecular laser isotope separation
MNSR	Miniature Neutron Source Reactor, ENTC
PFEP	Pilot Fuel Enrichment Plant, Natanz
PIL	physical inventory listing

SF_6	sulphur hexafluoride
TNRC	Tehran Nuclear Research Centre
TRR	Tehran Research Reactor, Tehran
UCF	Uranium Conversion Facility, ENTC
UCL	Uranium Chemistry Laboratory, ENTC
UF_4	uranium tetrachloride
UF_6	uranium hexafluoride
UO_2	uranium dioxide
UO_3	uranium trioxide
U_3O_8	urano-uranic oxide
UOC	uranium ore concentrate
WHF	Waste Handling Facility, TNRC
WSF	Waste Storage Facility, Karaj

IAEA
International Atomic Energy Agency

Board of Governors

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Item 5 (b) of the provisional agenda
(GOV/2003/44)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Report by the Director General

A. Introduction

1. On 6 June 2003, the Director General submitted to the Board of Governors for its consideration a report (GOV/2003/40) on a number of safeguards issues that needed to be clarified and actions that needed to be taken in connection with the implementation of the Agreement between the Islamic Republic of Iran (hereinafter referred to as Iran) and the IAEA for the application of safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/214) (the Safeguards Agreement).

2. In that report, the Director General stated that Iran had failed to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material imported into Iran and the subsequent processing and use of the material, and the declaration of facilities and other locations where the material was stored and processed. He described these failures and the actions being taken by Iran to correct them. In his report, the Director General also referred to the Agency's ongoing activities to verify the correctness and completeness of Iran's declarations and the safeguards measures the Secretariat intended to take in order to pursue questions that remained open.

3. At the conclusion of the Board's consideration of the Director General's report, the Chairperson summarized the Board's discussion. In the summary, the Chairperson stated that the Board shared the concern expressed by the Director General at the number of past failures by Iran to report material, facilities and activities as required by its safeguards obligations, and noted the actions taken by Iran thus far to correct these failures. The Board urged Iran promptly to rectify all safeguards problems identified in the Director General's report and to resolve questions that remained open. The Board welcomed Iran's reaffirmed commitment to full transparency and expressed its expectation that Iran would grant the Agency all necessary access. The Board encouraged Iran, as a confidence-building measure, not to introduce nuclear material at the Pilot Fuel Enrichment Plant (PFEP) located at Natanz

pending the resolution of related outstanding issues. The Board called on Iran to co-operate fully with the Agency in its on-going work, and took note of the introductory statement of the Director General, in which he called on Iran to permit the Agency to take environmental samples at the workshop of the Kalaye Electric Company in Tehran. The Board welcomed Iran's readiness to look positively at signing and ratifying an Additional Protocol, and urged Iran promptly and unconditionally to conclude and implement such a protocol, in order to enhance the Agency's ability to provide credible assurances regarding the peaceful nature of Iran's nuclear activities, particularly the absence of undeclared material and activities. Finally, the Board of Governors requested the Director General to provide a further report on the situation whenever appropriate.

B. Chronology since June 2003

4. As foreseen in GOV/2003/40, an Agency team of centrifuge technology experts visited Iran from 7 to 11 June 2003 to discuss Iran's centrifuge enrichment research and development (R&D) programme. On 24 June 2003, the Agency submitted to Iran for comments a summary report reflecting the results of those discussions and the findings of the Agency's centrifuge technology experts, and proposed a follow-up meeting with the Agency experts in July. That meeting ultimately took place from 9 to 12 August 2003 as indicated below.

5. On 11 June 2003, the Agency provided to the Permanent Mission of Iran in Vienna "talking points" on the results of environmental samples taken from the chemical traps of PFEP at Natanz indicating the presence of high enriched uranium particles, which was not consistent with the nuclear material declarations made by Iran. The Agency emphasized the need to clarify this issue promptly, and suggested that it be addressed during the proposed centrifuge technology expert meeting.

6. On 9 July 2003, the Director General, accompanied by the Deputy Director General for Safeguards and the Director of the Division of Safeguards Operations (B), visited Iran to discuss safeguards implementation issues. He met with the President, H.E. Mr. M. Khatami; the Foreign Minister, H.E. Mr. K. Kharrazi; and Vice President of Iran and President of the Atomic Energy Organization of Iran (AEOI), H.E. Mr. R. Aghazadeh. During these meetings, the Director General emphasized the importance of the urgent resolution of outstanding safeguards issues, such as those raised by the results of environmental sampling at PFEP and the findings by the Agency's centrifuge technology experts, and in that connection, the need for full transparency by Iran. He also stressed the importance of the conclusion of an Additional Protocol by Iran to enable the Agency to provide comprehensive and credible assurances about the peaceful nature of Iran's nuclear programme. The President of Iran assured the Director General of the readiness of Iran to co-operate fully with the Agency and reiterated Iran's positive attitude towards the conclusion of an Additional Protocol, but indicated that some technical and legal aspects needed to be clarified. It was agreed that technical discussions should follow the Director General's visit, and that the Agency should dispatch a team to clarify technical and legal aspects related to the Model Additional Protocol (INFCIRC/540 (Corr.)).

7. During the follow-up technical discussions, which were held from 10 to 13 July 2003 in Iran, the Agency team raised again the issue of the results of the environmental sampling at PFEP, and reiterated the Agency's request that, in fulfilment of Iran's stated commitment to full transparency, Iran permit the Agency to take environmental samples at the workshop of the Kalaye Electric Company in Tehran. The team also inquired as to whether, in accordance with that policy, Iran would permit the Agency to visit two locations near Hashtgerd (Lashkar Ab'ad and Ramandeh) at which it had been alleged, according to recent reports in open sources, that nuclear related activities were being

or had been conducted. The Iranian authorities indicated that they were not yet ready to discuss the findings of the Agency's centrifuge technology experts, nor were they willing at this stage to permit the Agency to take environmental samples at the workshop of the Kalaye Electric Company or to accede to the Agency's request to visit the two locations near Hashtgerd. The Iranian authorities indicated that they would like to propose a comprehensive solution to all of the enrichment related issues, but that it would take some time on their side. During the discussions, the specific issues that needed to be resolved were identified, and the Iranian side agreed to propose at an early date a timetable for resolving those issues.

8. In response to Iran's request for the clarification of aspects of the Additional Protocol, a team of Agency legal and technical experts participated in a meeting held in Tehran on 5 and 6 August 2003 with officials from a number of ministries of the Iranian Government. During the meeting, the Agency provided clarification of the Model Additional Protocol, and responded to detailed questions raised by the Iranian officials.

9. On 23 July 2003, the Agency received from the AEOI Vice President of Nuclear Safety and Safeguards a letter proposing a timetable for actions to be taken by 15 August 2003 in relation to urgent outstanding issues. In its reply of 25 July 2003, the Agency agreed to send to Iran a team of technical experts, with the understanding that the team would: (a) discuss the results of the environmental samples taken at Natanz; (b) take environmental samples at the workshop of the Kalaye Electric Company; (c) discuss the findings of the Agency centrifuge technology experts; and (d) visit the sites near Hashtgerd. This mission took place from 9 through 12 August 2003.

10. In a letter dated 19 August 2003, the AEOI provided additional information on the issues identified in the timetable, including Iran's heavy water reactor programme, Iran's use of previously imported UO_2 in experiments to produce UF_4, "bench scale" conversion experiments and Iran's past interest in laser fusion and spectroscopy.

11. In a letter dated 24 August 2003, the Resident Representative of Iran to the Agency informed the Director General that Iran was "prepared to begin negotiation with the [IAEA] on the Additional Protocol" and expressed the hope that, "in this negotiation the concerns of [Iran] and the ambiguities on the Additional Protocol are removed".

C. Implementation of Safeguards

C.1. Uranium Conversion

12. In GOV/2003/40, the Director General identified a number of corrective actions by Iran which were necessary to enable the Agency to verify the previously unreported nuclear material declared to have been imported by Iran in 1991. These actions included:

(a) The submission of inventory change reports (ICRs) on the transfer of the imported UO_2, UF_4 and UF_6 for further processing and use.

(b) The submission of ICRs on the production of uranium metal, uranyl nitrate, ammonium uranyl carbonate, UO_2 pellets and uranium wastes from the imported material.

(c) The provision of design information on the waste storage facility at Esfahan, and the granting of access to that facility as well as to Anarak and Qom, where waste resulting from the processing of the imported material is stored or has been disposed of.

(d) The submission of updated design information for the Molybdenum, Iodine and Xenon Radioisotope Production (MIX) Facility and for the Tehran Research Reactor (TRR) to reflect activities involving the imported nuclear material.

13. Since the June report of the Director General, Iran has provided ICRs on the transfer of the imported natural uranium for its further processing and use, as well as physical inventory lists (PILs) and material balance reports (MBRs) reflecting its use in the production of uranium metal, uranyl nitrate, UO_2 pellets and wastes (Iran has stated that no ammonium uranyl carbonate was produced from that material). In addition, Iran provided updated design information for MIX and TRR on the use of the imported material in experiments at those facilities. Iran has also provided information on the storage of waste at Esfahan, and has granted Agency inspectors access to that location and to the waste sites at Anarak and Qom.

14. Iran stated on a number of occasions between February and July 2003 that no R&D using nuclear material, even on a laboratory scale, had been conducted on the conversion and production of any other nuclear material at the Uranium Conversion Facility (UCF) (specifically, UO_2, UF_4 and UF_6). The Agency was told that the basic design of the UCF processes, and test reports for those processes, had been obtained from abroad. According to the AEOI, this information was sufficient to permit Iran to complete indigenously the detailed design and manufacturing of the equipment for UCF.

15. In a letter dated 19 August 2003, however, the Iranian authorities acknowledged that, in the early 1990s, there had been "bench scale" uranium conversion experiments. Iran has indicated that more time will be needed to find the people involved in these experiments and to trace any other closed down facilities. The Iranian authorities have indicated that they are currently preparing a response to the Agency questionnaires on closed down and decommissioned facilities in Iran and on Iran's nuclear fuel cycle, and that further information on the conversion experiments will be included in that response.

16. Drawing on this information, the Agency will continue with the verification of the imported nuclear material and its subsequent processing. In addition to physical verification activities and the evaluation of the ICRs, PILs and MBRs, this task involves the auditing of source documents on the shipment and subsequent processing of the nuclear material at various installations. Since some of the experiments took place a number of years ago and some of the imported material has been mixed with other nuclear material, the auditing and verification process is expected to be difficult and time consuming.

C.1.1. Processing of Imported UF_6

17. In March 2003, the Agency took environmental samples from the surfaces of all three of the cylinders said to have contained the imported UF_6 (two small S-type cylinders and a large 30B-type cylinder). The results of the analysis of those samples are now available and are consistent with the declaration by Iran that the material contained in them was natural uranium.

18. As previously reported to the Board of Governors (GOV/2003/40, para. 19), the Iranian authorities have stated that none of the imported UF_6 had been processed, and, specifically, that it had not been used in any centrifuge tests. It was observed during Agency verification in March 2003, however, that some of the UF_6 (1.9 kg) was missing from the two small cylinders. The Iranian authorities have stated that this might be due to leakage from the cylinders resulting from mechanical failure of the valves and possible evaporation due to their storage in a place where temperatures reach

55°C during the summer. On 18 August 2003, the Agency took environmental samples at the locations where Iran indicated that the small cylinders had been stored; these samples will need to be analysed and the results assessed. Investigation of this issue is continuing.

19. Verification of the contents of the large cylinder entail the weighing of the cylinder, non-destructive analysis (NDA), and destructive analysis of samples taken from the contents of the cylinder. While the weighing and NDA have been carried out, the taking of samples for destructive analysis can only be carried out when the equipment necessary for UF_6 transfer and sample taking has been installed at Natanz.

C.1.2. Processing of Imported UF_4

20. As described in the previous report (GOV/2003/40, para. 20), most of the imported natural UF_4 had been converted to uranium metal. As further noted therein, the Secretariat was seeking more information about the role of uranium metal in Iran's nuclear fuel cycle.

21. This matter was discussed further in the technical meetings held on 10–13 July in Iran. In a letter to the Agency dated 23 July 2003, the Iranian authorities stated that 113 experiments had been carried out at the Jabr Ibn Hayan Multipurpose Laboratories (JHL) using the imported UF_4 with a view to optimizing reaction conditions and parameters for producing uranium metal. In that same letter, Iran stated further that, "In the early [90's] when the country decided to reconsider its nuclear program, we were not sure whether it will consist of CANDU reactors, Magnox reactors[1] or light water reactors. Therefore it was decided to include a U-metal production line in the Uranium Conversion Facility (UCF) which could also be used to produce shielding material. However, as the picture is now more clear, uranium metal experiments could be considered as a process to gain know-how in nuclear material production". The Secretariat is pursuing this matter further with the Iranian authorities in light of the construction at JHL of a uranium metal purification and casting laboratory.

22. Recent results from the destructive analysis referred to in the previous report (GOV/2003/40, para. 20) indicated the presence of depleted uranium in a UF_4 sample taken from JHL. The Agency requested Iran to explain the source of that material, since no such material is reflected in the declared inventory of Iran. The Agency also reiterated its request that Iran investigate further whether any experiments on the conversion processes had been conducted using nuclear material.

23. In its letter of 19 August 2003, Iran stated that, after intensive investigations, it had been found that, "around the 1990's", some laboratory scale experiments had been carried out in the radiochemistry section of the NRC (the Tehran Nuclear Research Centre) to produce UF_4 using depleted UO_2 imported by Iran in 1977, but that neither the laboratory nor the radiochemistry section still existed.

C.1.3. Processing of Imported UO_2

24. The report in GOV/2003/40 described (paras 21–24) experiments said by Iran to have been carried out using the imported natural UO_2. These involved the testing of processes envisioned for UCF, isotope production experiments at TRR, and the use of pellets for testing chemical processes for the MIX Facility. Waste from these experiments was said to have been transferred to Esfahan, Anarak and Qom.

25. During the 9–12 August 2003 meeting with Iranian authorities, the Agency referred to earlier discussions which had taken place with Iran on samples taken at the hot cells of TRR and at the MIX

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[1] A reactor type that uses uranium metal

Facility which indicated the presence of depleted uranium, material which is not included in Iran's declared nuclear material inventory. Iran was provided with a summary of these sampling results. It was suggested by Iran that the presence of depleted uranium could, in some cases, have originated from shielded containers received from other countries (identified by Iran during that meeting). The Agency has investigated the matter further through a comparison of the recent sample analysis results with analytical results of environmental samples taken in those other countries, and it has concluded that the depleted uranium particles could have originated from the imported containers.

26. As anticipated in the Director General's June report, Agency inspectors have now visited the waste disposal site at Qom and the waste storage location at Anarak where uranium bearing wastes from some of the experiments have been stored. Iran has informed the Agency that the waste currently located at Anarak will be transferred to JHL. Based on explanations provided by Iran, the nuclear material in the waste transferred to and disposed of at Qom is considered to be measured discard.

C.2. Uranium Enrichment

C.2.1. Gas Centrifuge Enrichment Programme

27. The Agency is continuing its analysis of Iran's enrichment R&D programme. This process has included thus far a visit by Agency centrifuge technology experts to Iran in June 2003 and subsequent technical discussions with the Iranian authorities. The primary focus of these discussions has been to seek clarification of the statement made by the Iranian authorities in February 2003 that the design and development work, which had been started in 1997, had been based on information from open sources and extensive modelling and simulation, including tests of centrifuge rotors both with and without inert gas, and that the tests of the rotors, carried out on the premises of the Amir Khabir University and the premises of the AEOI in Tehran, had been conducted without nuclear material.

28. During the Agency's June visit, AEOI officials stated that the enrichment factor used in Iran's calculations had been obtained from some original centrifuge drawings, not from experiments. The Agency requested to be shown the original drawings. In August 2003, the AEOI presented redrawn copies of those documents, which included a design of a 164-machine cascade. The Iranian authorities have yet to show the Agency the originals.

29. In their summary report prepared after that visit, the experts judged that:

(a) Machines at PFEP at Natanz can be recognized as an early European design; and

(b) It is not possible to develop enrichment technology, to the level seen at Natanz, based solely on open source information and computer simulations, without process testing with UF_6.

30. These findings were provided to Iran, and were discussed with Iranian officials during the meetings that took place on 9–12 August 2003. In that discussion, in contrast to earlier information provided about the launch dates of the programme and its indigenous nature, AEOI officials stated that the decision to launch a centrifuge enrichment programme had actually been taken in 1985, and that Iran had received drawings of the centrifuge through a foreign intermediary around 1987. The officials described the programme as having consisted of three phases: activities during the first phase, from 1985 until 1997, had been located mainly at the AEOI premises in Tehran; during the second phase, between 1997 and 2002, the activities had been concentrated at the Kalaye Electric Company in Tehran; during the third phase, 2002 to the present, the R&D and assembly activities were moved to Natanz.

31. The Iranian authorities also explained that during the first phase, components had been obtained from abroad through foreign intermediaries or directly by Iranian entities, but that no help had been

received from abroad to assemble centrifuges or provide training. Efforts were concentrated on achieving an operating centrifuge, but many difficulties had been encountered as a result of machine crashes attributed to poor quality components. According to the AEOI officials, no experiments with inert or UF_6 gas were conducted. Iran indicated its willingness to make available for interview key scientists responsible for that phase of the enrichment programme. According to Iranian officials, from 1997 through 2002, the activities were concentrated at Kalaye Electric Company, and involved the assembly and testing of centrifuges, but again without inert or UF_6 gas.

32. During their 9–12 August 2003 visit to Iran, Agency inspectors were permitted to take environmental samples at the Kalaye Electric Company workshop, with a view to assessing the role of that company in Iran's enrichment R&D programme. The results of the analysis of these samples are not yet available. It was noted by inspectors that there had been considerable modification of the premises since their first visit in March 2003. Iranian authorities have informed the Agency that these modifications are attributable to the fact that the workshop is being transformed from use as a storage facility to its use as a laboratory for non-destructive analysis. This modification may impact on the accuracy of the environmental sampling and the Agency's ability to verify Iran's declarations about the types of activities previously carried out there.

33. On 25 June 2003, Iran introduced UF_6 into the first centrifuge for the purpose of single machine testing, and on 19 August 2003 began the testing of a small ten-machine cascade with UF_6. Iran continues to co-operate with the Agency in implementing safeguards measures now in place at PFEP for monitoring single machine and small cascade testing.

34. In accordance with its standard practice, the Agency took baseline environmental samples at PFEP at Natanz before nuclear material was introduced in the facility. This baseline sampling campaign was conducted during inspections carried out between March and June 2003, and samples were taken at many locations within the facility. While the Agency has already received the results from some of the samples (see below), which have been provided to Iran, other samples are still being analysed by a number of laboratories that participate in the Agency's Network of Analytical Laboratories.

35. Iran has stated that it has not carried out any enrichment and that no nuclear material was introduced to the PFEP prior to the Agency's having taken its first baseline environmental samples there. However, the sampling results which were provided to Iran on 11 June 2003, revealed particles of high enriched uranium. During the 10–13 July and 9–12 August 2003 technical meetings, more complete environmental sampling results were provided to Iran and the matter was discussed further.

36. The PFEP environmental sample results indicate the possible presence in Iran of high enriched uranium, material that is not on its inventory of declared nuclear material. During the August meeting, Iranian authorities indicated that they had carried out extensive investigation with a view to resolving this question, and had come to the conclusion that the high enriched uranium particles which had been detected must have resulted from contamination originating from centrifuge components which had been imported by Iran.

37. At that meeting, Agency inspectors explained that subsequent environmental sample analysis revealed the presence of two types of high enriched uranium, and noted that there had been differences among the samples taken from the surfaces of the centrifuge casings installed for the single machine tests. The Agency asked the Iranian authorities to investigate whether there were differences in the manufacturing history of those pieces of equipment. To investigate this matter further, the Agency took two additional samples from centrifuge components which were said to have been imported and those said to have been produced domestically. The results are not yet available.

38. Conceptually, it is possible to envisage a number of possible scenarios to explain the presence of high enriched uranium in environmental samples at Natanz. As part of the Agency's ongoing detailed plan of investigation each scenario will be considered carefully by Agency experts.

39. The Agency also intends to follow up with Iran information about other sites at which unreported nuclear activities allegedly are being or have been carried out.

C.2.2. Laser Programme

40. Iran has a substantial R&D programme on lasers. Iran has stated that it currently has no programme for laser isotope separation.

41. In May 2003, the Agency requested additional information about two sites near Hashtgerd owned by the AEOI which had been referred to in open source reports as locations allegedly engaged in laser and centrifuge uranium enrichment activities. The Agency was permitted to visit those locations on 12 August 2003.

42. One of the locations was Ramandeh, which belongs to the AEOI and is part of the Karaj Agricultural and Medical Centre. This location is primarily involved with agricultural studies said to be unrelated to nuclear fuel cycle activities. The other location visited was a laser laboratory at Lashkar Ab'ad belonging to the Research and Development Division of the AEOI. During that visit, Iranian officials stated that the laboratory had originally been devoted to laser fusion research and laser spectroscopy, but that the focus of the laboratory had been changed, and the equipment not related to current projects, such as a large imported vacuum vessel, had been moved. Among other activities observed by the Agency were the production and testing of copper vapour lasers of up to 100 watts. However, there appeared to be no activities directly related to laser spectroscopy or enrichment being carried out at the laboratory. The Iranian authorities were asked to confirm that there had not been in the past any activities related to uranium laser enrichment at this location or at any other location in Iran. The Agency has requested permission to take environmental samples at the laboratory, which the Iranian authorities have undertaken to consider.

43. In the letter from Iran dated 19 August 2003, the Agency was informed that, in the past, apart from planned co-operation in laser fusion and laser spectroscopy which never materialized, there had been a research thesis on laser spectroscopy of SF_6 prepared by a university student in co-operation with the laser division of AEOI. While such a study could be seen as relevant to laser enrichment, the underlying experiments appear not to have involved nuclear material.

C.3. Heavy Water Reactor Programme

44. On 13 July 2003 the Iranian authorities made a presentation on some technical features of the 40 MW(th) heavy water reactor (the Iran Nuclear Research Reactor, IR-40), construction of which is planned to start in 2004. The reactor, which Iranian officials have stated is based on indigenous design, is currently moving from the basic design phase to the detailed design phase. Iranian officials have further stated that Iran had tried unsuccessfully on several occasions to acquire from abroad a research reactor suitable for medical and industrial isotope production and for R&D to replace the old research reactor in Tehran. Iranian officials had concluded, therefore, that the only alternative was a heavy water reactor, which could use the UO_2 produced in UCF and the Zirconium Production Plant in Esfahan. According to the Iranian authorities, to meet the isotope production requirements, such a reactor should have a neutron flux of 10^{13} to 10^{14} n/cm^2/s, which would require power on the order of 30–40 MW(th) when using natural UO_2 fuel.

45. The Agency was provided on 4 August 2003 with an updated DIQ, which is currently being reviewed. The DIQ does not contain any references to hot cells, contrary to what would be expected

given the radioisotope production purposes of the facility. Iran has been asked to look into this matter further, particularly in light of recent open source accounts of alleged efforts by Iran to import remote manipulators and windows that would be suitable for use in hot cells.

46. In its 19 August 2003 letter, the AEOI provided information on the heavy water reactor programme, stating that a decision to start the R&D had been taken in the early 1980s. It further stated that, in the mid-1980s, laboratory scale experiments to produce heavy water had been conducted in the Esfahan Nuclear Technology Centre, and that a decision to construct a heavy water reactor had been taken in the mid-1990s. The letter provided additional information on the amount of heavy water initially needed for the IR-40, and on the design capacity of the heavy water production plant under construction at Khondab near Arak. According to the information provided in the letter, Iran plans to start the production of heavy water next year.

D. Findings, Assessments and Next Steps

47. In connection with the nuclear material imported by Iran in 1991, Iran has submitted ICRs, PILs and MBRs, as well as relevant DIQs. The Agency has verified nuclear material presented to it and is currently auditing relevant source data. The issue of depleted uranium in the UF_4 remains to be resolved, and the environmental samples taken in connection with the UF_6 cylinders need to be analysed. To confirm that the pellet irradiation experiments have been solely for radioisotope production, the Agency has taken samples from the hot cells and lead shielded cells at the laboratories of the Tehran Nuclear Research Centre. The analytical results are not yet available.

48. In its letter of 19 August 2003, Iran acknowledged that it had carried out uranium conversion experiments in the early 1990s, experiments that Iran should have reported in accordance with its obligations under the Safeguards Agreement. Iran has stated, however, that it is taking corrective action in that regard. The Agency will continue its evaluation of the uranium conversion programme.

49. As regards enrichment, and as mentioned earlier, during the meeting of 9–12 August 2003, the Agency team received new information about the chronology and details of Iran's centrifuge enrichment programme. Agency evaluation of the new information will require, inter alia, an assessment of the various phases of the programme and analysis of environmental samples taken at the Kalaye Electric Company workshop.

50. Additional work is also required to enable the Agency to arrive at conclusions about Iran's statements that there have been no uranium enrichment activities in Iran involving nuclear material. The Agency intends to continue its assessment of the Iranian statement that the high enriched uranium particles identified in samples taken at Natanz could be attributable to contamination from imported components. As agreed to by Iran, this process will involve discussions in Iran with Iranian officials and staff involved in the R&D efforts and visits by Agency inspectors and enrichment technology experts to facilities and other relevant locations. In that connection, Iran has agreed to provide the Agency with all information about the centrifuge components and other contaminated equipment it obtained from abroad, including their origin and the locations where they have been stored and used in Iran, as well as access to those locations so that the Agency may take environmental samples. It is also essential that the Agency receive information from Member States either from which nuclear related equipment or other assistance relevant to the development of Iran's nuclear programme has been exported to Iran, or which have information on such assistance.

51. In connection with the Agency's investigation of Iran's heavy water reactor programme, the Agency is currently evaluating design information provided on the heavy water reactor.

52. Since the last report was issued, Iran has demonstrated an increased degree of co-operation in relation to the amount and detail of information provided to the Agency and in allowing access requested by the Agency to additional locations and the taking of associated environmental samples. The decision by Iran to start the negotiations with the Agency for the conclusion of an Additional Protocol is also a positive step. However, it should be noted that information and access were at times slow in coming and incremental, and that, as noted above, some of the information was in contrast to that previously provided by Iran. In addition, as also noted above, there remain a number of important outstanding issues, particularly with regard to Iran's enrichment programme, that require urgent resolution. Continued and accelerated co-operation and full transparency on the part of Iran are essential for the Agency to be in a position to provide at an early date the assurances required by Member States.

53. The Director General will inform the Board of additional developments for its further consideration at the November meeting of the Board, or earlier, as appropriate.

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Item 7 (b) of the provisional agenda
(GOV/2003/32)

Implementation of the NPT safeguards agreement in the Islamic Republic of Iran

Report by the Director General

A. Introduction

1. At the meeting of the Board of Governors on 17 March 2003, the Director General reported on discussions taking place with the Islamic Republic of Iran (hereinafter referred to as Iran) on a number of safeguards issues that needed to be clarified and actions that needed to be taken with regard to the implementation of the Agreement between Iran and the IAEA for the Application of Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (the Safeguards Agreement)[1]. This report provides further information on the nature of the safeguards issues involved and the actions that need to be taken, and describes developments in this regard since March. More general reporting of safeguards implementation in Iran is not addressed in this document, but in the Safeguards Implementation Reports.[2]

B. Recent Developments

2. At the September 2002 regular session of the IAEA General Conference, Vice President of the Islamic Republic of Iran and President of the Atomic Energy Organization of Iran (AEOI), H.E. Mr. R. Aghazadeh, stated that Iran was "embarking on a long-term plan to construct nuclear power plants with a total capacity of 6000 MW within two decades". He also stated that such a sizeable project entailed "an all out planning, well in advance, in various field of nuclear technology such as fuel cycle, safety and waste management".

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[1] The Safeguards Agreement, reproduced in document INFCIRC/214, entered into force on 15 May 1974.

[2] The Agency has been applying safeguards at a range of facilities in Iran since the mid-1970s pursuant to its Safeguards Agreement. The list of facilities under safeguards is set out in the Annex to this report.

3. During the General Conference, the Director General met with the Vice President, and asked that Iran confirm whether it was building a large underground nuclear related facility at Natanz and a heavy water production plant at Arak, as reported in the media in August 2002. The Vice President provided some information on Iran's intentions to develop further its nuclear fuel cycle, and agreed on a visit to the two sites later in 2002 by the Director General, accompanied by safeguards experts, and to a discussion with Iranian authorities during that meeting on Iran's nuclear development plans.

4. The visit to Iran was originally scheduled for October 2002, but finally took place from 21 to 22 February 2003. The Director General was accompanied by the Deputy Director General for Safeguards (DDG-SG) and the Director of the Division of Safeguards Operations (B).

5. During his visit, the Director General was informed by Iran of its uranium enrichment programme, which was described as including two new facilities located at Natanz, namely a pilot fuel enrichment plant (PFEP) nearing completion of construction, and a large commercial-scale fuel enrichment plant (FEP) also under construction. These two facilities were declared to the Agency for the first time during that visit, at which time the Director General was able to visit both of them. Iran also confirmed that the heavy water production plant[3], referred to in paragraph 3 above, was under construction in Arak.

6. During the visit, the Director General was informed that Iran would accept modifications to its Subsidiary Arrangements, as requested by the Board of Governors in 1992[4], which would henceforth require the early provision of design information on new facilities and on modifications to existing facilities, as well as the early provision of information on new locations outside of facilities where nuclear material is customarily used (LOFs). This was confirmed to the Agency in a letter dated 26 February 2003 (see paragraph 15 below).

7. In addition, in response to the Agency's enquiry about certain transfers of nuclear material to Iran, only recently confirmed by the supplier State in response to repeated Agency enquiries, Iran acknowledged the receipt in 1991 of natural uranium, which had not been reported previously to the Agency, in the form of UF_6 (1000 kg), UF_4 (400 kg) and UO_2 (400 kg), which was now being stored at the previously undeclared Jabr Ibn Hayan Multipurpose Laboratories (JHL) located at the Tehran Nuclear Research Centre (TNRC). Iran also informed the Agency that it had converted most of the UF_4 into uranium metal in 2000 at JHL. This information was subsequently confirmed by Iran in a separate letter to the Agency dated 26 February 2003.

8. During the discussions in Iran in February between DDG-SG and the Iranian authorities, reference was made by the Agency to information in open sources on the possible conduct of enrichment activities at the workshop of the Kalaye Electric Company in Tehran. The Iranian authorities acknowledged that the workshop had been used for the production of centrifuge components, but stated that there had been no operations in connection with its centrifuge enrichment development programme involving the use of nuclear material, either at the Kalaye Electric Company or at any other location in Iran. According to the Iranian authorities, all testing had been carried out using simulation studies. While a centrifuge component production facility is not a nuclear facility required to be declared to the Agency under Iran's NPT Safeguards Agreement, Iran was requested, in light of its stated policy of transparency, to permit the Agency to visit the workshop and to take environmental samples there to assist the Agency in verifying Iran's declaration and confirming the absence of undeclared nuclear material and activities. The request was initially declined. The Iranian authorities

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[3] Heavy water production facilities are not nuclear facilities under comprehensive NPT safeguards agreements, and are thus not required to be declared to the Agency thereunder.

[4] GOV/2554/Att.2/Rev.2; GOV/OR/777, paras. 74-76.

told the Agency that Iran considered such visits, and the requested environmental sampling, as being obligatory only when an Additional Protocol was in force. However, they subsequently agreed to permit access to the workshop (to limited parts of the location in March, and to the entire workshop in May), and have recently indicated that they would consider permitting the taking of environmental samples during the visit of the Agency's enrichment experts to Iran scheduled to take place between 7 and 11 June 2003 (see paragraph 11 below).

9. On 26 February 2003, a list of additional questions and requests for clarification was submitted to Iran regarding its centrifuge and laser enrichment programmes and its heavy water programme, and a written reply requested. A written response was received from Iran on 4 June 2003, and its contents will be followed up with the Iranian authorities.

10. In a letter dated 5 May 2003, Iran informed the Agency for the first time of its intention to construct a heavy water research reactor at Arak (the 40 MW(th) Iran Nuclear Research Reactor IR-40). Iran also informed the Agency of its plan to commence construction in 2003 of a fuel manufacturing plant at Esfahan (FMP).

11. During a meeting between the Vice President and the Director General on 5 May 2003, the Director General reiterated the Agency's earlier request for permission to send Agency inspectors to the workshop of the Kalaye Electric Company in Tehran, and to take environmental samples. The Director General also referred to an earlier proposal the Agency had made in April for a group of Agency experts to visit Iran to discuss the centrifuge research and development programme to seek to assess how the current status of the project could have been achieved without using any nuclear material during tests. Iran agreed to consider the proposal for an expert mission, and subsequently agreed that the mission could take place from 7 to 11 June 2003.

C. Implementation of Safeguards

12. Article 8 of Iran's Safeguards Agreement requires Iran to provide the Agency with information "concerning nuclear material subject to safeguards under the Agreement and the features of facilities relevant to safeguarding such material."

13. As provided for in Article 34(c) of the Safeguards Agreement, nuclear material of a composition and purity suitable for fuel fabrication or for being isotopically enriched, and any nuclear material produced at a later stage in the nuclear fuel cycle, is subject to all of the safeguards procedures specified in the Agreement. These procedures include, inter alia, requirements for Iran to report to the Agency changes in the inventory of nuclear material through the submission of inventory change reports (ICRs).[5] Certain inventory changes entail additional reporting requirements. These include the import of nuclear material in quantities in excess of one effective kilogram, which, in accordance with Article 95 of the Safeguards Agreement, requires reporting to the Agency in advance of the import.

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[5] Inventory changes, as defined in Article 98.J of Iran's Safeguards Agreement, include, for example, imports, exports, domestic receipts and shipments, production of nuclear material in a reactor, loss of nuclear material due to its transformation into other elements or isotopes as a result of nuclear reactions, accidental losses of nuclear material and the generation of waste from processing which is deemed to be unrecoverable for the time being but which is stored.

14. To enable the Agency to verify the inventory and flow of nuclear material, Iran is also required to provide design information on facilities (as defined in Article 98.I of Iran's Safeguards Agreement), and information on LOFs. Pursuant to Article 42 of Iran's Safeguards Agreement, the time limit for the provision of design information on new nuclear facilities is to be specified in the Subsidiary Arrangements, but in any event it is to be provided "as early as possible before nuclear material is introduced into a new facility". Article 49 requires that information on LOFs be provided "on a timely basis".

15. The Subsidiary Arrangements General Part in force with Iran from 1976 to 26 February 2003 included what was, until 1992, standard text which called for provision to the Agency of design information on a new facility no later than 180 days before the introduction of nuclear material into the facility, and the provision of information on a new LOF together with the report relating to the receipt of nuclear material at the LOF. With the acceptance by Iran on 26 February 2003 of the modifications to the Subsidiary Arrangements proposed by the Agency, the Subsidiary Arrangements General Part now requires Iran to inform the Agency of new nuclear facilities and modifications to existing facilities through the provision of preliminary design information as soon as the decision to construct, to authorize construction or to modify has been taken, and to provide the Agency with further design information as it is developed. Information is to be provided early in the project definition, preliminary design, construction and commissioning phases.

C.1. Imported Nuclear Material

16. The UF_6, UF_4 and UO_2 imported by Iran in 1991 are materials that, as provided for in Article 34(c) of Iran's Safeguards Agreement, are subject to all of the safeguards procedures specified in the Agreement, including, in particular, the requirement to report inventory changes. Therefore, Iran was obliged to have reported the import of the material in question at the time of import. Equally, Iran was obliged to have reported design information as soon as possible before nuclear material was introduced to the receiving facility, and a Facility Attachment concluded for that facility.

17. In its letter of 26 February 2003 confirming its receipt of the material in question, Iran stated that its interpretation of Articles 34(c) and 95 of the Safeguards Agreement had been that no reporting to the Agency was required since the total amount of uranium did not exceed one effective kilogram. However, as indicated in paragraph 13 above, all material referred to in Article 34(c) of the Safeguards Agreement must be reported to the Agency. Article 95 simply imposes an additional requirement, that of advance notification, with respect to imports of material in excess of one effective kilogram.

18. Iran submitted on 15 April 2003 an ICR with regard to the import of the nuclear material, and, on 5 May 2003, preliminary design information for JHL, where most of the material is currently being stored.

C.1.1. Processing of UF_6

19. The Iranian authorities have stated that the imported UF_6 has not been processed, and specifically that it has not been used in any enrichment, centrifuge or other tests. The one large and two small UF_6 cylinders declared as containing the imported UF_6 were shown to the Agency in February. The cylinders were made available for Agency verification at JHL in March, at which time, after the Agency inspectors noted that one of the small cylinders was lighter than declared, the State authorities explained that a small amount of the UF_6 (1.9 kg) was missing due to leaking valves on the two small cylinders. It was explained during the subsequent inspection in April that the leaks had only been noticed a year before. Final evaluation will be completed when destructive samples have been taken, environmental samples have been analysed, and supporting documentation provided by the operator has been examined.

C.1.2. Processing of UF_4

20. Iran has informed the Agency that most of the imported UF_4 was converted to uranium metal at JHL. While the equipment for the conversion process has been dismantled and stored in a container (shown to the Agency during the February visit), Iran is now refurbishing that part of the facility as a uranium metal processing laboratory. The uranium metal, together with the remaining UF_4 and the related waste, has been presented for Agency verification. Final evaluation will be done when the results of destructive analysis become available, and supporting documentation provided by the facility operator has been examined. The role of uranium metal in Iran's declared nuclear fuel cycle still needs to be fully understood, since neither its light water reactors nor its planned heavy water reactors require uranium metal for fuel.

C.1.3. Processing of UO_2

21. During the February 2003 discussions, the Agency was informed by Iran that some of the imported UO_2 had been used at JHL for the testing of uranium purification and conversion processes. The experiments involved the dissolution of UO_2 with nitric acid, and the use of the resulting uranyl nitrate for testing a pulse column and ammonium uranyl carbonate (AUC) production processes envisioned for the Uranium Conversion Facility (UCF), a facility declared to the Agency in 2000 and currently under construction at Esfahan. In April, in response to Agency enquiries, the Iranian authorities informed the Agency that some of the UO_2 had also been used for isotope production experiments, including the undeclared irradiation of small amounts of the UO_2, at the Tehran Research Reactor (TRR). In addition, they informed the Agency that another small amount of UO_2 had been used in pellets to test the chemical processes of the Molybdenum, Iodine and Xenon Radioisotope Production Facility (MIX Facility). The unused UO_2 has been presented for Agency verification at JHL.

22. Most of the UO_2 used in the UCF-related experiments has been presented for Agency verification as liquid waste at Esfahan, the remaining waste has been disposed of at a location near Qom and cannot be verified. The whereabouts of the AUC produced during the UCF-related experiments is being discussed. Final evaluation of the accountancy will be completed when the results of destructive analysis become available, and the supporting documentation provided by the facility operator has been examined.

23. With respect to the isotope production experiments, Iran has stated that small amounts of the imported UO_2 were prepared for targets at JHL, irradiated at TRR, and sent to a laboratory belonging to the MIX Facility in Tehran for separation of I-131 in a lead-shielded cell. Iran has informed the Agency that the remaining nuclear waste was solidified and eventually transferred to a waste disposal site at Anarak. The operators at TRR and the MIX Facility have provided supporting documentation, which is being examined. The Agency is still awaiting relevant updated design information for the MIX Facility and TRR. Plans are in place to visit the waste site at Anarak in June.

24. With respect to the UO_2 to test the chemical processes of the MIX Facility, the material, including the resulting waste, has been presented for Agency verification at JHL. Final evaluation will be completed when the results of the destructive analysis become available, and supporting documentation provided by the facility operator has been examined.

C.2. Uranium Enrichment Programme

25. During the visit of the Director General in February 2003, the Vice President informed the Agency that over 100 of the approximately 1000 planned centrifuge casings had already been installed at the

pilot plant and that the remaining centrifuges would be installed by the end of the year. In addition, he informed the Agency that the commercial scale enrichment facility, which is planned to contain over 50 000 centrifuges, was not scheduled to receive nuclear material in the near future.

26. The Agency has been informed that the pilot enrichment plant is scheduled to start operating in June 2003, initially with single machine tests, and later with increasing numbers of centrifuges. The Iranian authorities have also informed the Agency that the commercial enrichment plant is planned to start accepting centrifuges in early 2005, after the design is confirmed by the tests to be conducted in the pilot enrichment plant. Iran has also stated that the design and research and development work, which had been started about five years ago, were based on extensive modelling and simulation, including tests of centrifuge rotors both with and without inert gas, and that the tests of the rotors, carried out on the premises of the Amir Khabir University and the AEOI in Tehran, were conducted without nuclear material.

27. In May 2003, Iran provided preliminary design information on the enrichment facilities under construction in Natanz, which are being examined by the Agency. Since March 2003, Agency inspectors have visited facilities at Natanz three times to conduct design information verification and to take environmental samples at the pilot enrichment plant. A first series of environmental and destructive analysis samples has been taken at a number of locations. Additional samples are expected to be taken in the near future. Iran has co-operated with the Agency in this regard. The Agency has presented to the Iranian authorities a safeguards approach for the pilot enrichment plant.

28. As indicated above, on 26 February 2003, the Agency forwarded a number of questions regarding Iran's research and development on centrifuges, including the chronology of its enrichment programme, with a view to assessing, inter alia, Iran's declaration that it had been developed without the centrifuges having been tested with UF_6 process gas. Similar questions and concerns have been raised by the Agency in relation to the UO_2, UF_4 and UF_6 production at the large scale conversion facility UCF, which is stated to have been constructed without any testing, even on a small scale, of key processes.

29. The Agency is also pursuing enquiries into Iran's laser programme. Iran has acknowledged the existence of a substantial programme on lasers, and Agency inspectors have visited some locations said to have been involved in that programme. However, Iran has stated that no enrichment related laser activities have taken place.

C.3. Heavy Water Programme

30. According to information provided by the Iranian authorities (see Section B above), the Iranian heavy water reactor programme consists of the heavy water production plant currently under construction at Arak; the 40 MW(th) IR-40, construction of which is planned to start at Arak in 2004; and the FMP at Esfahan, construction of which is planned for 2003, commissioning for 2006 and commencement of operation for 2007.

31. The stated purposes of the IR-40, which will use natural UO_2 fuel and heavy water (both as a coolant and as a moderator), are reactor research and development, radioisotope production and training. The stated purpose of the FMP is fabrication of fuel assemblies for the IR-40 and for the Bushehr Nuclear Power Plant (BNPP).

D. Findings and Initial Assessment

32. Iran has failed to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material, the subsequent processing and use of that material and the declaration of facilities where the material was stored and processed. These failures, and the actions taken thus far to correct them, can be summarized as follows:

(a) Failure to declare the import of natural uranium in 1991, and its subsequent transfer for further processing.

On 15 April 2003, Iran submitted ICRs on the import of the UO_2, UF_4 and UF_6. Iran has still to submit ICRs on the transfer of the material for further processing and use.

(b) Failure to declare the activities involving the subsequent processing and use of the imported natural uranium, including the production and loss of nuclear material, where appropriate, and the production and transfer of waste resulting therefrom.

Iran has acknowledged the production of uranium metal, uranyl nitrate, ammonium uranyl carbonate, UO_2 pellets and uranium wastes. Iran must still submit ICRs on these inventory changes.

(c) Failure to declare the facilities where such material (including the waste) was received, stored and processed.

On 5 May 2003, Iran provided preliminary design information for the facility JHL. Iran has informed the Agency of the locations where the undeclared processing of the imported natural uranium was conducted (TRR and the Esfahan Nuclear Technology Centre), and provided access to those locations. It has provided the Agency access to the waste storage facility at Esfahan, and has indicated that access would be provided to Anarak, as well as the waste disposal site at Qom.

(d) Failure to provide in a timely manner updated design information for the MIX Facility and for TRR.

Iran has agreed to submit updated design information for the two facilities.

(e) Failure to provide in a timely manner information on the waste storage at Esfahan and at Anarak.

Iran has informed the Agency of the locations where the waste has been stored or discarded. It has provided the Agency access to the waste storage facility at Esfahan, and has indicated that access will be provided to Anarak.

33. Although the quantities of nuclear material involved have not been large[6], and the material would need further processing before being suitable for use as the fissile material component of a nuclear explosive device, the number of failures by Iran to report the material, facilities and activities in question in a timely manner as it is obliged to do pursuant to its Safeguards Agreement is a matter of concern. While these failures are in the process of being rectified by Iran, the process of verifying the correctness and completeness of the Iranian declarations is still ongoing.

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[6] The total amount of material, approximately 1.8 tonnes, is 0.13 effective kilograms of uranium. This is, however, not insignificant in terms of a State's ability to conduct nuclear research and development activities.

34. The Agency is continuing to pursue the open questions, including through:

(a) The completion of a more thorough expert analysis of the research and development carried out by Iran in the establishment of its enrichment capabilities. This will require the submission by Iran of a complete chronology of its centrifuge and laser enrichment efforts, including, in particular, a description of all research and development activities carried out prior to the construction of the Natanz facilities. As agreed to by Iran, this process will also involve discussions in Iran between Iranian authorities and Agency enrichment experts on Iran's enrichment programme, and visits by the Agency experts to the facilities under construction at Natanz and other relevant locations.

(b) Further follow-up on information regarding allegations about undeclared enrichment of nuclear material, including, in particular, at the Kalaye Electric Company. This will require permission for the Agency to carry out environmental sampling at the workshop located there.

(c) Further enquiries about the role of uranium metal in Iran's nuclear fuel cycle.

(d) Further enquiries about Iran's programme related to the use of heavy water, including heavy water production and heavy water reactor design and construction.

35. The Director General has repeatedly encouraged Iran to conclude an Additional Protocol. Without such protocols in force, the Agency's ability to provide credible assurances regarding the absence of undeclared nuclear activities is limited. This is particularly the case for States, like Iran, with extensive nuclear activities and advanced fuel cycle technologies. In the view of the Director General, the adherence by Iran to an Additional Protocol would therefore constitute a significant step forward. The Director General will continue to keep the Board informed of developments.

LIST OF NUCLEAR FACILITIES UNDER IAEA SAFEGUARDS

LOCATION	AS IN SEPTEMBER 2002	NEW FACILITIES AS OF JUNE 2003
TEHRAN	Tehran Research Reactor (TRR)	
	Molybdenum, Iodine and Xenon Radioisotope Production Facility (MIX Facility)	
		Jabr Ibn Hayan Multipurpose Laboratories (JHL)
BUSHEHR	Bushehr Nuclear Power Plant (BNPP)	
ESFAHAN	Miniature Neutron Source Reactor (MNSR)	
	Light Water Sub-Critical Reactor (LWSCR)	
	Heavy Water Zero Power Reactor (HWSPR)	
	Fuel Fabrication Laboratory (FFL)	
	Uranium Chemistry Laboratory (UCL)	
	Uranium Conversion Facility (UCF)	
	Graphite Sub-Critical Reactor, decommissioned (GSCR)	
		Fuel Manufacturing Plant (FMP)
NATANZ		Pilot Fuel Enrichment Plant (PFEP)
		Fuel Enrichment Plant (FEP)
ARAK		Iran Nuclear Research Reactor (IR-40)

B

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March 2003

International Atomic Energy Agency
BOARD OF GOVERNORS

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RECORD OF THE ONE THOUSAND AND SIXTY-SECOND MEETING

Held at Headquarters, Vienna,
on Monday, 17 March 2003, at 10.45 a.m.

Extract (para. 24)

24. In February 2003, he [the Director General of IAEA] had visited the Islamic Republic of Iran at the invitation of the Government to discuss its plans for the use of nuclear power and also information that had come to the Secretariat's knowledge in September 2002 regarding the development of nuclear fuel cycle facilities there. He and his colleagues had visited a number of facilities, including a pilot gas centrifuge enrichment plant at Natanz that was nearly ready for operation and a much larger enrichment facility still under construction at the same site. During the visit, he had emphasized to the Iranian authorities that it was important for all States, and particularly those with sensitive nuclear fuel cycle facilities, to be fully transparent in their use of nuclear technology. He had stressed the value of bringing an additional protocol into force as an important tool for enabling the Agency to provide comprehensive assurances. President Khatami and other officials had affirmed that the Islamic Republic of Iran would abide by its NPT obligations to use all nuclear technology in the country exclusively for peaceful purposes and to follow a policy of transparency. To that end, the Islamic Republic of Iran had agreed that the subsidiary arrangements of its safeguards agreement be amended, thereby committing itself to providing design information on all new nuclear facilities at a much earlier date. He had been given assurances that the conclusion of an additional protocol would be actively considered. The Secretariat was currently discussing with the Iranian authorities a number of safeguards issues that needed to be clarified and a number of actions that needed to be taken.

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Resolutions/information circular/meeting record

IAEA
International Atomic Energy Agency

Board of Governors

GOV/2006/14
Date: 4 February 2006

Original: English

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The adopted agenda
(GOV/2006/13)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Resolution adopted on 4 February 2006

The Board of Governors,

(a) Recalling all the resolutions adopted by the Board on Iran's nuclear programme,

(b) Recalling also the Director General's reports,

(c) Recalling that Article IV of the Treaty on the Non Proliferation of Nuclear Weapons stipulates that nothing in the Treaty shall be interpreted as affecting the inalienable rights of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II of the Treaty,

(d) Commending the Director General and the Secretariat for their professional and impartial efforts to implement the Safeguards Agreement in Iran, to resolve outstanding safeguards issues in Iran and to verify the implementation by Iran of the suspension,

(e) Recalling the Director General's description of this as a special verification case,

(f) Recalling that in reports referred to above, the Director General noted that after nearly three years of intensive verification activity, the Agency is not yet in a position to clarify some important issues relating to Iran's nuclear programme or to conclude that there are no undeclared nuclear materials or activities in Iran,

(g) Recalling Iran's many failures and breaches of its obligations to comply with its NPT Safeguards Agreement and the absence of confidence that Iran's nuclear programme is exclusively for peaceful purposes resulting from the history of concealment of Iran's nuclear activities, the nature of those activities and other issues arising from the Agency's verification of declarations made by Iran since September 2002,

(h) Recalling that the Director General has stated that Iran's full transparency is indispensable and overdue for the Agency to be able to clarify outstanding issues (GOV/2005/67),

(i) Recalling the requests of the Agency for Iran's cooperation in following up on reports relating to equipment, materials and activities which have applications in the conventional military area and in the civilian sphere as well as in the nuclear military area (as indicated by the Director General in GOV/2005/67),

(j) Recalling that in November 2005 the Director General reported (GOV/2005/87) that Iran possesses a document related to the procedural requirements for the reduction of UF6 to metal in small quantities, and on the casting and machining of enriched, natural and depleted uranium metal into hemispherical forms,

(k) Expressing serious concerns about Iran's nuclear programme, and agreeing that an extensive period of confidence-building is required from Iran,

(l) Reaffirming the Board's resolve to continue to work for a diplomatic solution to the Iranian nuclear issue, and

(m) Recognising that a solution to the Iranian issue would contribute to global non-proliferation efforts and to realising the objective of a Middle East free of weapons of mass destruction, including their means of delivery,

1. Underlines that outstanding questions can best be resolved and confidence built in the exclusively peaceful nature of Iran's programme by Iran responding positively to the calls for confidence building measures which the Board has made on Iran, and in this context deems it necessary for Iran to:

- re-establish full and sustained suspension of all enrichment-related and reprocessing activities, including research and development, to be verified by the Agency;
- reconsider the construction of a research reactor moderated by heavy water;
- ratify promptly and implement in full the Additional Protocol;
- pending ratification, continue to act in accordance with the provisions of the Additional Protocol which Iran signed on 18 December 2003;
- implement transparency measures, as requested by the Director General, including in GOV/2005/67, which extend beyond the formal requirements of the Safeguards Agreement and Additional Protocol, and include such access to individuals, documentation relating to procurement, dual use equipment, certain military-owned workshops and research and development as the Agency may request in support of its ongoing investigations;

2. Requests the Director General to report to the Security Council of the United Nations that these steps are required of Iran by the Board and to report to the Security Council all IAEA reports and resolutions, as adopted, relating to this issue;

3. Expresses serious concern that the Agency is not yet in a position to clarify some important issues relating to Iran's nuclear programme, including the fact that Iran has in its possession a document on the production of uranium metal hemispheres, since, as reported by the Secretariat, this process is related to the fabrication of nuclear weapon components; and, noting that the decision to put this document under Agency seal is a positive step, requests Iran to maintain this document under Agency seal and to provide a full copy to the Agency;

4. Deeply regrets that, despite repeated calls from the Board for the maintaining of the suspension of all enrichment related and reprocessing activities which the Board has declared essential to addressing outstanding issues, Iran resumed uranium conversion activities at its Isfahan facility on 8 August 2005 and took steps to resume enrichment activities on 10 January 2006;

5. Calls on Iran to understand that there is a lack of confidence in Iran's intentions in seeking to develop a fissile material production capability against the background of Iran's record on safeguards as recorded in previous Resolutions, and outstanding issues; and to reconsider its position in relation to confidence-building measures, which are voluntary, and non legally binding, and to adopt a constructive approach in relation to negotiations that can result in increased confidence;

6. Requests Iran to extend full and prompt cooperation to the Agency, which the Director General deems indispensable and overdue, and in particular to help the Agency clarify possible activities which could have a military nuclear dimension;

7. Underlines that the Agency's work on verifying Iran's declarations is ongoing and requests the Director General to continue with his efforts to implement the Agency's Safeguards Agreement with Iran, to implement the Additional Protocol to that Agreement pending its entry into force, with a view to providing credible assurances regarding the absence of undeclared nuclear material and activities in Iran, and to pursue additional transparency measures required for the Agency to be able to resolve outstanding issues and reconstruct the history and nature of all aspects of Iran's past nuclear activities;

8. Requests the Director General to report on the implementation of this and previous resolutions to the next regular session of the Board, for its consideration, and immediately thereafter to convey, together with any Resolution from the March Board, that report to the Security Council; and

9. Decides to remain seized of the matter.

Result of Roll Call Vote taken on 4 February 2006 on document GOV/2006/12/Rev.1

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran
Draft resolution submitted by France, Germany and the United Kingdom

Algeria	Abstention
Argentina	Yes
Australia	Yes
Belarus	Abstention
Belgium	Yes
Brazil	Yes
Canada	Yes
China	Yes
Colombia	Yes
Cuba	No
Ecuador	Yes
Egypt	Yes
France	Yes
Germany	Yes
Ghana	Yes
Greece	Yes
India	Yes
Indonesia	Abstention
Japan	Yes
Korea, Rep. of	Yes
Libyan Arab Jamahiriya	Abstention
Norway	Yes
Portugal	Yes
Russian Federation	Yes
Singapore	Yes
Slovakia	Yes
Slovenia	Yes
South Africa	Abstention
Sri Lanka	Yes
Sweden	Yes
Syrian Arab Republic	No
United Kingdom of Great Britain and Northern Ireland	Yes
United States of America	Yes
Venezuela	No
Yemen	Yes

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IAEA
International Atomic Energy Agency

Board of Governors

GOV/2005/77
Date: 24 September 2005

Original: English

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Item 6(d) of the agenda
(GOV/2005/70)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Resolution adopted on 24 September 2005

The Board of Governors,

(a) Recalling the resolutions adopted by the Board on 11 August 2005 (GOV/2005/64), 29 November 2004 (GOV/2004/90), 18 September 2004 (GOV/2004/79), 18 June 2004 (GOV/2004/49, 13 March 2004 (GOV/2004/21), 26 November 2003 (GOV/2003/81) and on 12 September 2003 (GOV/2003/69), the statement of the Board of 19 June 2003 (GOV/OR.1072) and the Chairman of the Board's conclusions of March 2005 (GOV/OR.1122) and of June 2005 (GOV/OR.1130),

(b) Recalling that Article IV of the Treaty on the Non Proliferation of Nuclear Weapons stipulates that nothing in the Treaty shall be interpreted as affecting the inalienable rights of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II of the Treaty,

(c) Commending the Director General and the Secretariat for their professional and impartial efforts to implement the Safeguards Agreement in Iran, to resolve outstanding safeguards issues in Iran and to verify the implementation by Iran of the suspension,

(d) Recalling Iran's failures in a number of instances over an extended period of time to meet its obligations under its NPT Safeguards Agreement (INFCIRC 214) with respect to the reporting of nuclear material, its processing and its use, as well as the declaration of facilities where such material had been processed and stored, as reported by the Director General in his report GOV/2003/75 dated 10 November 2003 and confirmed in GOV/2005/67, dated 2 September 2005,

(e) Recalling also that, as deplored by the Board in its resolution GOV/2003/81, Iran's policy of concealment has resulted in many breaches of its obligation to comply with its Safeguards Agreement,

3. Requests the Director General to continue his efforts to implement this and previous Resolutions and to report again, including any further developments on the issues raised in his report of 2 September 2005 (GOV/2005/67) to the Board. The Board will address the timing and content of the report required under Article XII.C and the notification required under Article III.B.4;

4. In order to help the Director General to resolve outstanding questions and provide the necessary assurances, urges Iran:

(i) To implement transparency measures, as requested by the Director General in his report, which extend beyond the formal requirements of the Safeguards Agreement and Additional Protocol, and include access to individuals, documentation relating to procurement, dual use equipment, certain military owned workshops and research and development locations;

(ii) To re-establish full and sustained suspension of all enrichment-related activity, as in GOV/2005/64, and reprocessing activity;

(iii) To reconsider the construction of a research reactor moderated by heavy water;

(iv) Promptly to ratify and implement in full the Additional Protocol;

(v) Pending completion of the ratification of the Additional Protocol to continue to act in accordance with the provisions of the Additional Protocol, which Iran signed on 18 December 2003;

5. Calls on Iran to observe fully its commitments and to return to the negotiating process that has made good progress in the last two years;

6. Requests the Director General to continue his efforts to implement the Agency's Safeguards Agreement with Iran, to implement provisionally the Additional Protocol to that Agreement, and to pursue additional transparency measures required for the Agency to be able to reconstruct the history and nature of all aspects of Iran's past nuclear activities, and to compensate for the confidence deficit created; and

7. Decides to remain seized of the matter.

Result of Roll Call Vote taken on 24 September 2005 on document GOV/2005/76

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran
Draft resolution submitted by France, Germany and the UK

Algeria	Abstention
Argentina	Yes
Australia	Yes
Belgium	Yes
Brazil	Abstention
Canada	Yes
China	Abstention
Ecuador	Yes
France	Yes
Germany	Yes
Ghana	Yes
Hungary	Yes
India	Yes
Italy	Yes
Japan	Yes
Korea, Rep.of	Yes
Mexico	Abstention
Netherlands	Yes
Nigeria	Abstention
Pakistan	Abstention
Peru	Yes
Poland	Yes
Portugal	Yes
Russian Federation	Abstention
Singapore	Yes
Slovakia	Yes
South Africa	Abstention
Sri Lanka	Abstention
Sweden	Yes
Tunisia	Abstention
UK	Yes
USA	Yes
Venezuela	No
Vietnam	Abstention
Yemen	Abstention

Roll-call vote on Iran of 24 Sept 2005

IAEA
International Atomic Energy Agency

Board of Governors

GOV/2005/64
Date: 11 August 2005

Original: English

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The provisional agenda
(GOV/2005/59)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran and related Board resolutions

Resolution adopted on 11 August 2005

The Board of Governors,

(a) Recalling the resolutions adopted by the Board on 29 November 2004 (GOV/2004/90), 18 September 2004 (GOV/2004/79), 18 June 2004 (GOV/2004/49), 13 March 2004 (GOV/2004/21), 26 November 2003 (GOV/2003/81) and on 12 September 2003 (GOV/2003/69) and the statement by the Board of 19 June 2003 (GOV/OR.1072),

(b) Recalling that in the resolution adopted on 18 September 2004 (GOV/2004/79) the Board considered it necessary, to promote confidence, that Iran immediately suspend all enrichment-related activities, including the production of feed material, including through tests or production at the UCF,

(c) Recalling that in its resolution adopted on 29 November 2004 (GOV/2004/90) the Board noted with interest the agreement between Iran, France, Germany and the UK with the support of the High Representative of the EU, made public on 15 November 2004 (INFCIRC/637),

(d) Reaffirming that, as underlined in the resolution adopted on 29 November 2004 (GOV/2004/90), the full and sustained implementation of the suspension notified by Iran to the Director General on 14 November, as a further voluntary, non-legally binding confidence-building measure, to be verified by the Agency, is essential to addressing outstanding issues,

(e) Noting that outstanding issues relating to Iran's nuclear programme have yet to be resolved, and that the Agency is not yet in a position to conclude that there are no undeclared nuclear materials or activities in Iran,

(f) Recalling the Director General's assessment in GOV/2004/83 that all the declared nuclear material in Iran had been accounted for, and that such material had not been diverted to prohibited activities,

(g) Recognising the right of states to the development and practical application of atomic energy for peaceful purposes, including the production of electric power, consistent with their Treaty obligations, with due consideration for the needs of developing countries, and

(h) Stressing the need for effective safeguards to prevent nuclear material being used for prohibited purposes, in contravention of legally binding agreements, and underlining the vital importance of effective safeguards for facilitating cooperation in the field of nuclear energy,

1. Expresses serious concern at the 1 August 2005 notification to the IAEA that Iran had decided to resume the uranium conversion activities at the Uranium Conversion Facility in Esfahan, at the Director General's report that on 8 August Iran started to feed uranium ore concentrate into the first part of the process line at this facility and at the Director General's report that on 10 August Iran removed the seals on the process lines and the UF4 at this facility;

2. Underlines the importance of rectifying the situation resulting from the developments reported by the Director General and also of allowing for further discussions in relation to that situation;

3. Urges Iran to re-establish full suspension of all enrichment related activities including the production of feed material, including through tests or production at the Uranium Conversion Facility, on the same voluntary, non-legally binding basis as requested in previous Board resolutions, and to permit the Director General to re-instate the seals that have been removed at that facility;

4. Requests the Director General to continue to monitor closely the situation and to inform the Board of any further developments as appropriate;

5. Requests the Director General to provide a comprehensive report on the implementation of Iran's NPT Safeguards Agreement and this resolution by 3 September 2005; and

6. Decides to remain seized of the matter.

IAEA
International Atomic Energy Agency

Information Circular

INFCIRC/648
Date: 1 August 2005

General Distribution
Original: English

Communication dated 1 August 2005 received from the Permanent Mission of the Islamic Republic of Iran to the Agency

The Secretariat of the Agency received on 1 August 2005 a Note Verbale dated 1 August 2005 from the Permanent Mission of the Islamic Republic of Iran (Iran). In accordance with the request contained in the Note Verbale, the text is attached herewith for the information of all Member States.

In the Note Verbale, Iran informed the Agency, inter alia, that Iran had "decided to resume the uranium conversion activities at UCF [Uranium Conversion Facility] in Esfahan on 1 August 2005." Iran requested the Agency "to be prepared for the implementation of the Safeguards related activities in a timely manner prior to the resumption of the UCF activities."

In response to the Note Verbale, the Agency, in a letter dated 1 August 2005, informed Iran that, in order to implement effective safeguards at UCF, the Agency would need to install additional surveillance equipment at the input and output stages of certain process lines prior to any resumption of any such activities and that, prior to the planned movement of U_3O_8, the Agency would need to verify the nuclear material in question. The Agency further informed Iran that, to that end, the Agency was in the process of preparing the necessary equipment for UCF, and would expect to be in a position to install the equipment some time next week. The Agency also informed Iran that, "to ensure continuity of knowledge, it is essential that Iran refrain from removing the Agency's seals and from moving any nuclear material at UCF until such time as the surveillance equipment is installed and the Agency has verified the material."

In its resolution adopted on 29 November 2004 (GOV/2004/90), the Board, inter alia, welcomed Iran's decision to continue and extend its suspension of all enrichment related and reprocessing activities, and underlined that the full and sustained implementation of the suspension, which was a voluntary, non-legally-binding, confidence building measure, to be verified by the Agency, was essential to addressing outstanding issues. The Board also requested the Director General to continue verifying that the suspension remained in place and to inform Board Members, inter alia, should the suspension not be fully sustained. By means of this Information Circular, the Director General is informing the Members of the Board of Governors, as well as all Member States, accordingly.

Permanent Mission of the
Islamic Republic of Iran
to the United Nations and other
International Organizations in Vienna

جمهوری اسلامی ایران
نمایندگی دائم نزد دفتر ملل متحد و سازمانهای بین المللی
وین

URGENT

Verbal Note No.: 350-1-17/928

The Permanent Mission of the Islamic Republic of Iran to the United Nations and other International Organizations in Vienna presents its compliments to the Secretariat of the IAEA and has the honour to state the following:

Since early 1980s, Iran's peaceful nuclear program and its inalienable right to nuclear technology have been the subject of the most extensive and intensive campaign of denial, obstruction, intervention and misinformation.

- Valid and binding contracts to build nuclear power plants were unilaterally abrogated;
- Nuclear material rightfully purchased and owned by Iran were illegally withheld;
- exercise of Iran's shareholder's right in several national and multinational nuclear power corporations were obstructed;
- Unjustified and coercive interventions were routinely made in order to undermine, impede and delay the implementation of Iran's nuclear agreements with third parties; and
- Unfounded accusations against Iran's exclusively peaceful nuclear program were systematically publicized.

While Iran's rights under the NPT have continued to be grossly and systematically violated, and while major state parties to the Treaty have persisted in their non-compliance with many of their obligations under Articles I, IV and VI of the Treaty in general, and under paragraph 2 of Article IV vis-a-vis Iran in particular, Iran nevertheless continued diligently to comply with all its obligations under the Treaty. At the same time and merely in order to prevent further illegal and illegitimate restrictions on the exercise of its rights, Iran was forced to be discrete in its legal activities, avoiding to disclose the details of programs, which, in nearly all cases, it was not any way obliged to disclose in accordance with its obligations under its safeguards agreement with the IAEA.

In October 2003, Iran entered into an agreement with France, Germany and the United Kingdom with the explicit expectation to open a new chapter of full transparency, cooperation and access to nuclear and other advanced technologies. Iran agreed to a number of important transparency and voluntary confidence building measures and immediately and fully implemented them.

- It signed and immediately began full implementation of the Additional Protocol;
- It opened its doors to one of the most expansive and intrusive IAEA inspections;

- It provided a detailed account of its peaceful nuclear activities, all of which had been carried out in full conformity with its rights and obligations under the NPT;
- It began and has continuously maintained for the past 20 months a voluntarily suspension of its rightful enrichment of Uranium as a confidence building measure;
- It further expanded in February and November 2004, following agreements with E3/EU in Brussels and Paris respectively, its voluntary suspension to incorporate activities which go well beyond the original Agency's definition of "enrichment" and even "enrichment-related" activities.

Iran has worked closely with the Agency, during the course of the last two years, to deal with the issues and questions raised about its peaceful nuclear program. All significant issues, particularly those related to the sources of HEU, have now been resolved. Indeed, except for few questions, mostly speculative, nothing more remains to close this Chapter.

The Agency's thorough inspections of Iran repeatedly confirmed Iran's statement that any amount of inspection and scrutiny will never show the slightest diversion into military activity. The Director-General confirmed in Paragraph 52 of his November 2003 report that "to date, there is no evidence that the previously undeclared nuclear material and activities referred to above were related to a nuclear weapons programme." After one more year and over a thousand person-days of the most rigorous inspections, the Director-General again confirmed in Paragraph 112 of his November 2004 report that "all the declared nuclear material in Iran has been accounted for, and therefore such material is not diverted to prohibited activities."

Regrettably, Iran received very little, if anything, in return and instead has repeatedly expanded its voluntary confidence building measures only to be reciprocated by broken promises and expanded requests. The October 2003 promises of the E3 on nuclear cooperation and regional security and non-proliferation have yet to be even addressed. The February 2004 commitment by the E3 to "work actively to gain recognition at the June 2004 Board of the efforts made by Iran, so that the Board works thereafter on the basis of Director-General reporting if and when he deems it necessary, in accordance with the normal practice pertaining to the implementation of Safeguards Agreements and the Additional Protocol", in response to Iran's expansion of its suspension to include assembly and component manufacturing was not fulfilled, until Iran agreed in November 2004 to the expansion of voluntary suspension to include the Uranium Conversion Facility which had been originally defined by the Secretariat of the IAEA as outside the scope of any definition of "enrichment-related activities". And the E3/EU has yet to honor its recognition, in the Paris Agreement of November 2004, of "Iran's rights under the NPT exercised in conformity with its obligations under the Treaty, without discrimination."

After over three months of negotiations following the Paris Agreement, it became evident the E3/EU simply wanted prolonged and fruitless negotiations, thereby prejudicing the exercise of Iran's inalienable right to resume its legal enrichment activities, and did not have the intention or the ability to present its proposals on objective guarantees on peaceful nature of Iran's nuclear program, as well as firm guarantees on economic, technological and nuclear cooperation and firm commitments on security issues.

In a further testament to Iran's desire to ensure the success of the negotiations, so that Iran's rightful nuclear program could also enjoy the support and confidence of the West, Iran suggested to the E3/EU to ask the IAEA to develop technical, legal and monitoring modalities for Iran's enrichment program as objective guarantees to ensure that Iran's nuclear program will remain exclusively for peaceful purposes. While one member of E3/EU accepted the suggestion, lack of consensus among the E3 prevented resort to the IAEA as an authoritative and impartial framework for solving the impasse.

Finally, on March 23, 2005, Iran offered a collection of solutions for objective guarantees suggested by various independent scientist and observers from the United States and Europe. The package included:

1. Strong and mutually beneficial relations between Iran and the EU/E3, which would provide the best guarantee for respect for the concerns of each side;

2. Confinement of Iran's enrichment program, in order to preclude through objective technical guarantees any proliferation concern:
    a. Open fuel cycle, to remove any concern about reprocessing and production of plutonium;
    b. Ceiling of enrichment at LEU level;
    c. Limitation of the extent of the enrichment program to solely meet the contingency fuel requirements of Iran's power reactors;
    d. Immediate conversion of all enriched Uranium to fuel rods to preclude even the technical possibility of further enrichment;
    e. Incremental and phased approach to implementation in order to begin with the least sensitive aspects of the enrichment program and to gradually move to enrichment as confidence in the program would be enhanced;

3. Legislative and regulatory measures
    a. Additional Protocol;
    b. Permanent ban on the development, stockpiling and use of nuclear weapons through binding national legislation;
    c. Enhancement of Iran's export control regulations;

4. Enhanced monitoring
    a. Continued implementation of the Additional Protocol; and
    b. Continuous on-site presence of IAEA inspectors at the conversion and enrichment facilities to provide unprecedented added guarantees.

Extraneous pressures prevented timely and serious consideration by E3/EU of this proposal which has the potential of providing a framework in which concerns of all sides are reasonably allayed. Even Iran's further effort to salvage the process by suggesting the negotiated commencement of implementation of phase 1 of that proposal on limited resumption of the work of the UCF - which had never had any past alleged failures, and is virtually proliferation free — with additional confidence building and surveillance and monitoring measures was misconstrued by the E3/EU as an ultimatum.

In order to correct any wrong perception about an ultimatum and to ensure that no opportunity was spared for an agreed settlement, Iran agreed to extend the period of full suspension for another two months, in response to a commitment made by the E3/EU ministers in Geneva to finally present their comprehensive package for the implementation of the Paris Agreement by the end of July or early August 2005, that is nearly nine months after the Agreement.

Iran made it clear in Geneva that any proposal by the E3/EU must incorporate E3/EU's perception of objective guarantees for the gradual resumption of the Iranian enrichment program, and that any attempt to turn objective guarantees into cessation or long-term suspension were incompatible with the letter and spirit of the Paris Agreement and therefore unacceptable to Iran.

Eager to salvage the negotiations, in a message to the Ministers, Iran offered the most flexible solution to the E3/EU as they were finalizing their package:

- Commencement of the work of Esfahan plant (UCF) at low capacity and under full scope monitoring, while arrangements for import of the feed material and export of the product are worked out with you and other potential partners; (Negotiations on these arrangements have already started and preliminary agreement has been reached.)
- Further negotiations on a mutually acceptable arrangement for an initial limited operation at Natanz or allowing the Agency to develop an optimized arrangement on numbers, monitoring mechanism and other specifics for such an initial limited operation at Natanz;
- Negotiations for full scale operation of Natanz would continue on the premise that it would be synchronized with the fuel requirements of light water reactors.

Against all its sincere efforts and maximum flexibility, Iran has not received a proposal as of today, and all public and diplomatic information, particularly the letter of 29 July 2005 of the E3 Ministers, indicate that the content of the eventual proposal will be totally unacceptable. We have been informed that the proposal not only fails to address Iran's rights for peaceful development of nuclear technology, but even falls far short of correcting the illegal and unjustified restrictions placed on Iran's economic and technological development, let alone providing firm guarantees for economic, technological and nuclear cooperation and firm commitments on security issues. While we had made it crystal clear that no incentive would be sufficient to compromise Iran's inalienable right to all aspects of peaceful nuclear technology, such offers of incentives are in and of themselves demeaning and totally incommensurate with Iran and its vast capabilities, potentials and requirements.

It is now self-evident that negotiations are not proceeding as called for in the Paris Agreement, due to E3/EU policy to protract the negotiations without the slightest attempt to move forward in fulfilling their commitments under the Tehran or Paris Agreements. This protracted continuation is solely geared to serve the purpose of keeping the suspension in place for as long as it takes to make the cessation a *fait accompli*. This is contrary to the letter and spirit of the Paris Agreement and is not in line with principles of good faith negotiations.

After such long period of negotiations and so much that Iran has done to restore confidence and the flexibility that it has shown, there is no pretext for any further delay in the implementation of the first phase of Iran's proposal, by limited resumption of UCF at Esfahan, which is free from any past alleged failures, and is virtually proliferation free. With additional proposed arrangements, it should leave no excuse for anyone.

It must be underlined that all States party to the NPT, without discrimination, have an inalienable right to produce nuclear energy for peaceful purposes. As this right is "inalienable", it cannot be undermined or curtailed under any pretext. Any attempt to do so, would be an attempt to undermine a pillar of the Treaty and indeed the Treaty itself.

Iran, like any other Non-Nuclear-Weapon State, has no obligation to negotiate and seek agreement for the exercise of its "inalienable" right, nor can it be obligated to suspend it. Suspension of Uranium enrichment, or any derivative of such suspension, is a voluntary and temporary confidence-building measure, effectuated by Iran in order to enhance cooperation and close the chapter of denials of access to technology imposed by the west on Iran. It is not an end in itself, nor can be it construed or turned into a permanent abandonment of a perfectly lawful activity, thereby perpetuating, rather than easing, the pattern of denial of access to technology.

The suspension has been in place for nearly 20 months, with all its economic and social ramifications affecting thousands of families. The E3/EU has failed to remove any of its multifaceted restrictions on Iran's access to advanced and nuclear technology. In a twist of logic, it has attempted to prolong the suspension, thereby trying to effectively widen its restrictions instead of fulfilling its commitments of October 2003 and November 2004 to remove them.

As the IAEA Board of Governors has underlined, suspension "is a voluntary, non-legal binding confidence building measure". When the Board itself explicitly recognizes that suspension is "not a legally-binding obligation", no wording by the Board can turn this voluntary measure into an essential element for anything. In fact the Board of Governors has no factual or legal ground, nor any statutory power, to make or enforce such a demand, or impose ramifications as a consequence of it.

In light of the above, Iran has decided to resume the uranium conversion activities at the UCF in Esfahan on 1 August 2005.

The Agency is hereby requested to be prepared for the implementation of the Safeguards related activities in a timely manner prior to the resumption of the UCF activities.

The Islamic Republic of Iran wants to ensure that no effort is spared in order to reach a negotiated resumption of its enrichment activities. It is therefore, prepared to continue in good faith and in an expeditious and result-oriented manner, its negotiations with E3/EU. Meanwhile, Iran will continue to maintain its voluntary suspension of all enrichment-related activities. It is to be noted that the UCF was not originally considered by the Agency to be included in such category.

Iran is committed to non-proliferation and elimination of nuclear weapons, and considers nuclear weapons and capability to produce or acquire them as detrimental to its security. Iran will continue to abide by its obligations under the NPT and will continue to work actively for the establishment of a zone free from weapons of mass destruction in the Middle East.

The Permanent Mission of the Islamic Republic of Iran to the United Nations and other International Organizations in Vienna requests the Secretariat this Note to be officially circulated as INFCIRC document and avails itself of this opportunity to renew to the Secretariat of the IAEA the assurances of its highest consideration.

Vienna, 1 August 2005

To the
IAEA Secretariat

Attn.: Dr. Mohamed ElBaradei
Director-General of the IAEA

IAEA
International Atomic Energy Agency

Board of Governors

GOV/2004/90
Date: 29 November 2004

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Item 4(d) of the agenda
(GOV/2004/87)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Resolution adopted by the Board on 29 November 2004

The Board of Governors,

(a) Recalling the resolutions adopted by the Board on 18 September 2004 (GOV/2004/79), 18 June 2004 (GOV/2004/49), 13 March 2004 (GOV/2004/21), 26 November 2003 (GOV/2003/81) and on 12 September 2003 (GOV/2003/69) and the statement by the Board of 19 June 2003 (GOV/OR.1072),

(b) Noting with appreciation the Director General's report of 15 November 2004 (GOV/2004/83) on the implementation of Iran's NPT Safeguards Agreement (INFCIRC 214),

(c) Noting specifically the Director General's assessment that Iranian practices up to October 2003 resulted in many breaches of Iran's obligations to comply with its Safeguards Agreement, but that good progress has been made since that time in Iran's correction of those breaches and in the Agency's ability to confirm certain aspects of Iran's current declarations,

(d) Also noting specifically the Director General's assessment that all the declared nuclear material in Iran has been accounted for, and that such material is not diverted to prohibited activities, but that the Agency is not yet in a position to conclude that there are no undeclared nuclear materials or activities in Iran,

(e) Recalling the Board's previous requests to Iran to suspend all enrichment related and reprocessing activities as a voluntary confidence building measure,

(f) Noting with concern that Iran has continued enrichment related activities, including the production of UF6 up to 22 November 2004, in spite of the request made by the Board in September that Iran immediately suspend all such activities,

(g) Noting with interest the agreement between Iran, France, Germany and the UK with the support of the High Representative of the EU, made public on 15 November

(INFCIRC 637), in which Iran states its decision to continue and extend its suspension of all enrichment related and reprocessing activities; and noting with satisfaction that, pursuant to this agreement, notification of this decision was sent by Iran to the Director General on 14 November with the Agency invited to verify the suspension with effect from 22 November 2004,

(h) Recognizing that this suspension is a voluntary confidence building measure, not a legal obligation,

(i) Recognizing the right of states to the development and practical application of atomic energy for peaceful purposes, including the production of electric power, consistent with their Treaty obligations, with due consideration for the needs of the developing countries,

(j) Stressing the need for effective safeguards to prevent nuclear material being used for prohibited purposes, in contravention of agreements, and underlining the vital importance of effective safeguards for facilitating cooperation in the field of nuclear energy, and

(k) Commending the Director General and the Secretariat for the work they have done to date to resolve all questions relevant to safeguards implementation in Iran,

1. Welcomes the fact that Iran has decided to continue and extend its suspension of all enrichment related and reprocessing activities, and underlines that the full and sustained implementation of this suspension, which is a voluntary, non-legally-binding, confidence building measure, to be verified by the Agency, is essential to addressing outstanding issues;

2. Welcomes the Director General's statements of 25 and 29 November 2004 that the above decision has been put into effect, and requests the Director General to continue verifying that the suspension remains in place and to inform Board members should the suspension not be fully sustained, or should the Agency be prevented from verifying all elements of the suspension, for as long as the suspension is in force;

3. Welcomes Iran's continuing voluntary commitment to act in accordance with the provisions of the Additional Protocol, as a confidence building measure that facilitates the resolution of the questions that have arisen, and calls on Iran once again to ratify its Protocol soon;

4. Reaffirms its strong concern that Iran's policy of concealment up to October 2003 has resulted in many breaches of Iran's obligations to comply with its NPT Safeguards Agreement; at the same time acknowledges the corrective measures described in the Director General's report;

5. Welcomes the Director General's intention to pursue his investigations into the remaining outstanding issues, in particular the origin of contamination and the extent of Iran's centrifuge programme, as well as the full implementation of Iran's Safeguards Agreement and Additional Protocol, with a view to providing credible assurances regarding the absence of undeclared nuclear material and activities in Iran;

6. Underlines the continuing importance of Iran extending full and prompt cooperation to the Director General in the above pursuit, and requests Iran as a confidence building measure to provide any access deemed necessary by the Agency in accordance with the Additional Protocol; and

7. Requests the Director General to report to the Board on his findings, as appropriate.

IAEA
International Atomic Energy Agency

Board of Governors

GOV/2004/79
Date: 18 September 2004

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Item 8(d) of the agenda
(GOV/2004/71)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Resolution adopted by the Board on 18 September 2004

The Board of Governors

(a) Recalling the resolutions adopted by the Board on 18 June 2004 (GOV/2004/49), 13 March 2004 (GOV/2004/21), 26 November 2003 (GOV/2003/81), and on 12 September 2003 (GOV/2003/69) and the statement by the Board of 19 June 2003 (GOV/OR.1072),

(b) Noting with appreciation the Director General's report of 1 September 2004 (GOV/2004/60), on the implementation of safeguards in Iran,

(c) Noting the Director General's assessment that the Agency is making steady progress towards understanding Iran's nuclear programmes, but that further work is still required on a number of questions and issues, notably contamination and the scope of the P2 centrifuge programme, and that there are other issues that will also require further follow-up, for example the timeframe of Iran's plutonium separation experiments,

(d) Noting with serious concern that, as detailed in the Director General's report, Iran has not heeded repeated calls from the Board to suspend, as a confidence building measure, all enrichment-related and reprocessing activities,

(e) Also concerned that, at its Uranium Conversion Facility, Iran is planning to introduce 37 tonnes of yellowcake, as this would run counter to the request made of Iran by the Board in resolution GOV/2004/49,

(f) Recognising the right of states to the development and practical application of atomic energy for peaceful purposes, including the production of electric power, consistent with their Treaty obligations, with due consideration for the needs of the developing countries, and

(g) Stressing the need for effective safeguards to prevent nuclear material being used for prohibited purposes, in contravention of agreements, and underlining the vital importance of effective safeguards for facilitating cooperation in the field of nuclear energy,

1. Strongly urges that Iran respond positively to the Director General's findings on the provision of access and information by taking such steps as are required by the Agency and/or requested by the Board in relation to the implementation of Iran's Safeguards Agreement, including the provision of prompt access to locations and personnel, and by providing further information and explanations when required by the Agency and proactively, to assist the Agency to understand the full extent and nature of Iran's enrichment programme and to take all steps within its power to clarify the outstanding issues before the Board's 25 November meeting, specifically including the sources and reasons for enriched uranium contamination, and the import, manufacture, and use of centrifuges;

2. Emphasises the continuing importance of Iran acting in accordance with all provisions of the Additional Protocol including by providing all access required in a timely manner; and urges Iran once again to ratify its Protocol without delay;

3. Deeply regrets that the implementation of Iranian voluntary decisions to suspend enrichment-related and reprocessing activities, notified to the Agency on 29 December 2003 and 24 February 2004, fell significantly short of the Agency's understanding of the scope of those commitments and also that Iran has since reversed some of those decisions; stresses that such suspension would provide the Board with additional confidence in Iran's future activities; and considers it necessary, to promote confidence, that Iran immediately suspend all enrichment-related activities, including the manufacture or import of centrifuge components, the assembly and testing of centrifuges, and the production of feed material, including through tests or production at the UCF, under Agency verification so that this could be confirmed in the reports requested in paragraphs 7 and 8 below;

4. Calls again on Iran, as a further confidence-building measure, voluntarily to reconsider its decision to start construction of a research reactor moderated by heavy water;

5. Underlines the need for the full and prompt cooperation with the Agency of third countries in relation to the clarification of outstanding issues, and expresses appreciation for the cooperation received by the Agency to date;

6. Appreciates the professional and impartial efforts of the Director General and the Secretariat to implement Iran's NPT Safeguards Agreement, and, pending its entry into force, Iran's Additional Protocol, as well as to verify Iran's suspension of enrichment-related and reprocessing activities, and to investigate supply routes and sources;

7. Requests the Director General to submit in advance of the November Board:

- a report on the implementation of this resolution;
- a recapitulation of the Agency's findings on the Iranian nuclear programme since September 2002, as well as a full account of past and present Iranian cooperation with the Agency, including the timing of declarations, and a record of the development of all aspects of the programme, as well as a detailed analysis of the implications of those findings in relation to Iran's implementation of its Safeguards Agreement;

8. Also requests the Director General to submit in advance of the November Board a report on Iran's response to the requests made of it by the Board in previous resolutions, especially requests relating to full suspension of all enrichment-related and reprocessing activities;

9. Decides that at its November session it will decide whether or not further steps are appropriate in relation to:

- Iran's obligations under its NPT Safeguards Agreement;
- the requests made of Iran, as confidence building measures, by the Board in this and previous resolutions;

and to remain seized of the matter.

IAEA
International Atomic Energy Agency

Board of Governors

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Item 8(e) of the agenda
(GOV/2004/45)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Resolution adopted by the Board on 18 June 2004

The Board of Governors,

(a) Recalling the resolutions adopted by the Board on 13 March 2004 (GOV/2004/21), 26 November 2003 (GOV/2003/81), and on 12 September 2003 (GOV/2003/69) and the statement by the Board of 19 June 2003 (GOV/OR.1072),

(b) Noting with appreciation the Director General's report of 1 June 2004 (GOV/2004/34), on the implementation of safeguards in Iran,

(c) Reiterating its appreciation that Iran has continued to act as if its Additional Protocol were in force, and noting with satisfaction that Iran has submitted to the Agency the initial declarations pursuant to that Protocol,

(d) Noting, however, that Iran has yet to ratify the Protocol as called for in previous Board resolutions,

(e) Recalling Iran's voluntary decisions to suspend all enrichment-related and reprocessing activities and to permit the Agency to verify that suspension; noting with concern that, as detailed in the Director General's report, this verification was delayed in some cases, and that the suspension is not yet comprehensive because of the continued production of centrifuge equipment; also noting with concern that Iran's decision to proceed with the generation of UF_6 is at variance with the Agency's previous understanding as to the scope of Iran's decision regarding suspension; and further noting that Iran has withheld 10 assembled centrifuge rotors for research activities,

(f) Encouraged by the Director General's assessment that there has been good progress on the actions agreed during the Director General's visit to Tehran in early April 2004 and that the Agency continues to make progress in gaining a comprehensive understanding of Iran's nuclear programme, but noting with concern that after almost two years from when Iran's undeclared programme came to the Agency's knowledge a number of questions remain outstanding, and in particular two questions that are key to understanding the extent and nature of Iran's enrichment programme: the sources of all HEU contamination in Iran and the extent and nature of work undertaken on the basis of the P-2 advanced centrifuge design,

(g) Noting in this context with serious concern that important information about the P-2 centrifuge programme has often been forthcoming only after repeated requests, and in some cases has been incomplete and continues to lack the necessary clarity and also that the information provided to date relating to contamination issues has not been adequate to resolve this complex matter,

(h) Noting with appreciation that the Agency has received some information from other states that may be helpful in resolving some contamination questions,

(i) Noting with concern that the Agency's investigations have revealed further omissions in the statements made by Iran, including in the October declaration, in particular concerning the importation of P-2 components from abroad and concerning laser enrichment tests, which have produced samples enriched up to 15%, and also that Agency experts have raised questions and doubts regarding the explanations provided by Iran concerning those programmes, which require further clarification,

(j) Recognising the inalienable right of states to the development and practical application of atomic energy for peaceful purposes, including the production of electric power, consistent with their treaty obligations, with due consideration for the needs of the developing countries,

(k) Stressing the need for effective safeguards in order to prevent the use of nuclear material for prohibited purposes in contravention of safeguards agreements and underlining the vital importance of effective safeguards for facilitating cooperation in the field of nuclear energy, and

(l) Acknowledging the statement by the Director General on 14 June that it is essential for the integrity and credibility of the inspection process to bring these issues to a close within the next few months,

1. Acknowledges that Iranian cooperation has resulted in Agency access to all requested locations, including four workshops belonging to the Defence Industries Organisation;

2. Deplores, at the same time, the fact that, overall, as indicated by the Director General's written and oral reports, Iran's cooperation has not been as full, timely and proactive as it should have been, and, in particular, that Iran postponed until mid-April visits originally scheduled for mid-March - including visits of Agency centrifuge experts to a number of locations involved in Iran's P-2 centrifuge enrichment programme - resulting in some cases in a delay in the taking of environmental samples and their analysis;

3. Underlines that, with the passage of time, it is becoming ever more important that Iran work proactively to enable the Agency to gain a full understanding of Iran's enrichment programme by providing all relevant information, as well as by providing prompt access to all relevant places, data and persons; and calls on Iran to continue and intensify its cooperation so that the Agency may provide the international community with required assurances about Iran's nuclear activities;

4. Calls on Iran to take all necessary steps on an urgent basis to help resolve all outstanding questions, especially that of LEU and HEU contamination found at various locations in Iran, including by providing additional relevant information about the origin of the components in question and explanations about the presence of a cluster of 36% HEU particles; and also the question of the nature and scope of Iran's P-2 centrifuge programme, including by providing full documentation and explanations at the request of the Agency;

5. Welcomes Iran's submission of the declarations under Articles 2 and 3 of its Additional Protocol, and stresses the importance of Iran complying with the deadlines for further declarations required by Articles 2 and 3 of the Protocol, and that all such declarations should be correct and complete;

6. Emphasises the importance of Iran continuing to act in accordance with the provisions of the Additional Protocol to provide reassurance to the international community about the nature of Iran's nuclear programme; and urges Iran to ratify without delay its Protocol;

7. Recalls that in previous resolutions the Board called on Iran to suspend all enrichment-related and reprocessing activities; welcomes Iran's voluntary decisions in that respect; regrets that those commitments have not been comprehensively implemented and calls on Iran immediately to correct all remaining shortcomings, and to remove the existing variance in relation to the Agency's understanding of the scope of Iran's decisions regarding suspension, including by refraining from the production of UF_6 and from all production of centrifuge components, as well as to enable the Agency to verify fully the suspension;

8. In the context of Iran's voluntary decisions to suspend all enrichment-related and reprocessing activities, calls on Iran, as a further confidence-building measure, voluntarily to reconsider its decision to begin production testing at the Uranium Conversion Facility and also, as an additional confidence building measure, to reconsider its decision to start construction of a research reactor moderated by heavy water, as the reversal of those decisions would make it easier for Iran to restore international confidence undermined by past reports of undeclared nuclear activities in Iran;

9. Recalls that the full and prompt cooperation with the Agency of all third countries is essential in the clarification of certain outstanding questions, notably contamination;

10. Commends the Director General and the Secretariat for their professional and impartial efforts to implement Iran's safeguards agreement, and, pending its entry into force, Iran's Additional Protocol, as well as to verify Iran's suspension of enrichment-related and reprocessing activities, and to investigate supply routes and sources;

11. Requests the Director General to report well in advance of the September Board - or earlier if appropriate - on these issues as well as on the implementation of this and prior resolutions on Iran; and

12. Decides to remain seized of the matter.

IAEA
International Atomic Energy Agency

Board of Governors

GOV/2004/21
Date: 13 March 2004

Restricted Distribution
Original: English

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Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Resolution adopted by the Board on 13 March 2004

The Board of Governors,

(a) Recalling the resolutions adopted by the Board on 26 November 2003 (GOV/2003/81), and on 12 September 2003 (GOV/2003/69) and the statement by the Board of 19 June 2003 (GOV/OR.1072),

(b) Noting with appreciation the Director General's report of 24 February 2004 (GOV/2004/11), on the implementation of safeguards in Iran,

(c) Commending the Director General and the Secretariat for their continuing efforts to implement the Safeguards Agreement with Iran and to resolve all outstanding issues in Iran,

(d) Noting with satisfaction that Iran signed the Additional Protocol on 18 December 2003 and that, in its communication to the Director General of 10 November 2003, Iran committed itself to acting in accordance with the provisions of the Protocol with effect from that date; but also noting that the Protocol has not yet been ratified as called for in the Board's resolutions of 26 November 2003 (GOV/2003/81) and 12 September 2003 (GOV/2003/69),

(e) Noting the decision by Iran of 24 February 2004 to extend the scope of its suspension of enrichment-related and reprocessing activities, and its confirmation that the suspension applied to all facilities in Iran,

(f) Noting with serious concern that the declarations made by Iran in October 2003 did not amount to the complete and final picture of Iran's past and present nuclear programme considered essential by the Board's November 2003 resolution, in that the Agency has since uncovered a number of omissions -- e.g., a more advanced centrifuge design than previously declared, including associated research, manufacturing and testing activities; two mass spectrometers used in the laser enrichment programme; and designs for the construction of hot cells at the Arak heavy water research reactor -- which require further investigation, not least as they may point to nuclear activities not so far acknowledged by Iran,

(g) Noting with equal concern that Iran has not resolved all questions regarding the development of its enrichment technology to its current extent, and that a number of other questions remain unresolved, including the sources of all HEU contamination in Iran; the location, extent, and nature of work undertaken on the basis of the advanced centrifuge design; the nature, extent and purpose of activities involving the planned heavy-water reactor; and evidence to support claims regarding the purpose of polonium-210 experiments, and

(h) Noting with concern, also in light of the Director General's report of 20 February 2004 (GOV/2004/12), that, although the timelines are different, Iran's and Libya's conversion and centrifuge programmes share several common elements, including technology largely obtained from the same foreign sources,

1. Recognizes that the Director General reports Iran to have been actively cooperating with the Agency in providing access to locations requested by the Agency, but, as Iran's cooperation so far has fallen short of what is required, calls on Iran to continue and intensify its cooperation, in particular through the prompt and proactive provision of detailed and accurate information on every aspect of Iran's past and present nuclear activities;

2. Welcomes Iran's signature of the Additional Protocol; urges its prompt ratification; underlines the Board's understanding that, in its communication to the Director General of 10 November 2003, Iran voluntarily committed itself to acting in accordance with the provisions of the Protocol with effect from that date; and stresses the importance of Iran complying with the deadline for declarations envisaged in Article 3 of the Protocol;

3. Recalls that in its resolutions of 26 November 2003 and 12 September 2003 the Board called on Iran to suspend all enrichment-related and reprocessing activities, notes that Iran's voluntary decisions of 29 December 2003 and 24 February 2004 constitute useful steps in this respect, calls on Iran to extend the application of this commitment to all such activities throughout Iran, and requests the Director General to verify the full implementation of these steps;

4. Deplores that Iran, as detailed in the report by the Director General, omitted any reference, in its letter of 21 October 2003 which was to have provided the "full scope of Iranian nuclear activities" and a "complete centrifuge R&D chronology", to its possession of P-2 centrifuge design drawings and to associated research, manufacturing, and mechanical testing activities -- which the Director General describes as "a matter of serious concern, particularly in view of the importance and sensitivity of those activities";

5. Echoes the concern expressed by the Director General over the issue of the purpose of Iran's activities related to experiments on the production and intended use of polonium-210, in the absence of information to support Iran's statements in this regard;

6. Calls on Iran to be pro-active in taking all necessary steps on an urgent basis to resolve all outstanding issues, including the issue of LEU and HEU contamination at the Kalaye Electric Company workshop and Natanz; the issue of the nature and scope of Iran's laser isotope enrichment research; and the issue of the experiments on the production of polonium-210;

7. Notes with appreciation that the Agency is investigating the supply routes and sources of technology and related equipment, and nuclear and non-nuclear materials, found in Iran, and reiterates that the urgent, full and close cooperation with the Agency of all third countries is essential in the clarification of outstanding questions concerning Iran's nuclear programme, including the acquisition of nuclear technology from foreign sources; and also appreciates any cooperation in this regard as may already have been extended to the Agency;

8. Requests the Director General to report on these issues before the end of May, as well as on the implementation of this and prior resolutions on Iran, for consideration by the June Board of Governors -- or to report earlier if appropriate;

9. Decides to defer until its June meeting, and after receipt of the report of the Director General referred to above, consideration of progress in verifying Iran's declarations, and of how to respond to the above-mentioned omissions; and

10. Decides to remain seized of the matter.

IAEA
International Atomic Energy Agency

Board of Governors

GOV/2003/81
Date: 26 November 2003

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Item 3 (b) of the agenda
(GOV/2003/78)

Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Resolution adopted by the Board on 26 November 2003

The Board of Governors,

(a) Recalling the Resolution adopted by the Board on 12 September 2003 (GOV/2003/69), in which the Board, inter alia:

- expressed concern over failures by the Islamic Republic of Iran to report material, facilities and activities that Iran is obliged to report pursuant to its Safeguards Agreement;

- decided it was essential and urgent, in order to ensure IAEA verification of non-diversion of nuclear material, that Iran remedy all failures identified by the Agency and cooperate fully with the Agency by taking all necessary actions by the end of October 2003;

- requested Iran to work with the Secretariat to promptly and unconditionally sign, ratify and fully implement the Additional Protocol, and, as a confidence-building measure, to act thenceforth in accordance with the Additional Protocol; and

- called on Iran to suspend all further uranium enrichment-related activities, including the further introduction of nuclear material into Natanz, and any reprocessing activities,

(b) Welcoming the Agreed Statement between the Foreign Ministers of France, Germany and the United Kingdom and the Secretary of the Iranian Supreme National Security Council issued in Tehran on 21 October,

(c) Noting with appreciation the Director General's report of 10 November 2003 (GOV/2003/75), on the implementation of safeguards in Iran,

(d) Commending the Director General and the Secretariat for their professional and impartial efforts to implement the Safeguards Agreement with Iran and to resolve all outstanding safeguards issues in Iran, in pursuance of the Agency's mandate and of the implementation, inter alia, of the Resolution adopted by the Board on 12 September 2003 (GOV/2003/69),

(e) Acknowledging that Vice-President Aghazadeh of the Islamic Republic of Iran has reaffirmed his country's decision to provide a full picture of its nuclear activities and has also reaffirmed his country's decision to implement a policy of cooperation and full transparency,

(f) Noting with deep concern that Iran has failed in a number of instances over an extended period of time to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material, and its processing and use, as well as the declaration of facilities where such material has been processed and stored, as set out in paragraph 48 of the Director General's report,

(g) Noting in particular, with the gravest concern, that Iran enriched uranium and separated plutonium in undeclared facilities, in the absence of IAEA safeguards,

(h) Noting also, with equal concern, that there has been in the past a pattern of concealment resulting in breaches of safeguard obligations and that the new information disclosed by Iran and reported by the Director General includes much more that is contradictory to information previously provided by Iran,

(i) Noting that the Director General, in his opening statement, indicated that Iran has begun cooperating more actively with the IAEA and has given assurances that it is committed to a policy of full disclosure,

(j) Recognising that, in addition to the corrective actions already taken, Iran has undertaken to present all nuclear material for Agency verification during its forthcoming inspections,

(k) Emphasising that, in order to restore confidence, Iranian cooperation and transparency will need to be complete and sustained so that the Agency can resolve all outstanding issues and, over time, provide and maintain the assurances required by Member States,

(l) Noting with satisfaction that Iran has indicated that it is prepared to sign the Additional Protocol, and that, pending its entry into force, Iran will act in accordance with the provisions of that Protocol,

(m) Noting that the Director General, in his opening statement, reported that Iran has decided to suspend enrichment-related and reprocessing activities,

(n) Stressing that the voluntary suspension by Iran of all its uranium enrichment-related activities and reprocessing activities remains of key importance to rebuilding international confidence,

(o) Recognising the inalienable right of States to the development and practical application of atomic energy for peaceful purposes, including the production of electric power, with due consideration for the needs of developing countries,

(p) Stressing the need for effective safeguards in order to prevent the use of nuclear material for prohibited purposes in contravention of safeguards agreements, and underlining the vital importance of effective safeguards for facilitating cooperation in the field of peaceful uses of nuclear energy,

1. Welcomes Iran's offer of active cooperation and openness and its positive response to the demands of the Board in the resolution adopted by Governors on 12 September 2003 (GOV/2003/69) and underlines that, in proceeding, the Board considers it essential that the declarations that have now been made by Iran amount to the correct, complete and final picture of Iran's past and present nuclear programme, to be verified by the Agency;

2. Strongly deplores Iran's past failures and breaches of its obligation to comply with the provisions of its Safeguards Agreement, as reported by the Director General; and urges Iran to adhere strictly to its obligations under its Safeguards Agreement in both letter and spirit;

3. Notes the statement by the Director General that Iran has taken the specific actions deemed essential and urgent and requested of it in paragraph 4 of the Resolution adopted by the Board on 12 September 2003 (GOV/2003/69);

4. Requests the Director General to take all steps necessary to confirm that the information provided by Iran on its past and present nuclear activities is correct and complete as well as to resolve such issues as remain outstanding;

5. Endorses the view of the Director General that, to achieve this, the Agency must have a particularly robust verification system in place: an Additional Protocol, coupled with a policy of full transparency and openness on the part of Iran, is indispensable;

6. Reiterates that the urgent, full and close co-operation with the Agency of all third countries is essential in the clarification of outstanding questions concerning Iran's nuclear programme;

7. Calls on Iran to undertake and complete the taking of all necessary corrective measures on an urgent basis, to sustain full cooperation with the Agency in implementing Iran's commitment to full disclosure and unrestricted access, and thus to provide the transparency and openness that are indispensable for the Agency to complete the considerable work necessary to provide and maintain the assurances required by Member States;

8. Decides that, should any further serious Iranian failures come to light, the Board of Governors would meet immediately to consider, in the light of the circumstances and of advice from the Director General, all options at its disposal, in accordance with the IAEA Statute and Iran's Safeguards Agreement;

9. Notes with satisfaction the decision of Iran to conclude an Additional Protocol to its Safeguards Agreement, and re-emphasises the importance of Iran moving swiftly to ratification and also of Iran acting as if the Protocol were in force in the interim, including by making all declarations required within the required timeframe;

10. Welcomes Iran's decision voluntarily to suspend all enrichment-related and reprocessing activities and requests Iran to adhere to it, in a complete and verifiable manner; and also endorses the Director General's acceptance of Iran's invitation to verify implementation of that decision and report thereon;

11. Requests the Director General to submit a comprehensive report on the implementation of this resolution by mid- February 2004, for consideration by the March Board of Governors, or to report earlier if appropriate; and

12. Decides to remain seized of the matter.

IAEA
International Atomic Energy Agency

Board of Governors

GOV/2003/69
Date: 12 September 2003

Restricted Distribution
Original: English

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Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

Resolution adopted by the Board on 12 September 2003

The Board of Governors,

(a) Recalling the Director General's report of 6 June 2003 (GOV/2003/40), which expressed concern over failures by the Islamic Republic of Iran to report material, facilities and activities as it was obliged to do pursuant to its safeguards agreement, and noted that the Secretariat continues to investigate a number of unresolved issues,

(b) Recalling also recent statements by Iranian authorities recommitting Iran to full NPT and IAEA safeguards compliance and renouncing Iranian interest in nuclear weapons,

(c) Acknowledging Iran's decision to start negotiations for the conclusion of an additional protocol, but noting it does not meet the Board's 19 June request that Iran promptly and unconditionally sign and implement such a Protocol,

(d) Noting with appreciation the Director General's report of 26 August 2003 (GOV/2003/63), on the implementation of safeguards in Iran, and acknowledging that as a result of intensive inspection activities in Iran by the Agency since February, the Agency now has a better, although still incomplete, understanding of Iran's nuclear programme,

(e) Commending the Secretariat for its continuing efforts to resolve all outstanding safeguards issues and sharing the view of the Director General that much essential work remains to be completed urgently to enable the Agency to draw conclusions on the programme,

(f) Noting the interim nature of the report of the Director General and calling on Iran to further enhance cooperation and provide full transparency to allow the Agency to fully understand and verify all aspects of Iran's nuclear programme, including the full history of its enrichment programme,

(g) Concerned by the statement of the Director General that information and access were at times slow in coming and incremental, that some of the information was in contrast to that previously provided by Iran, and that there remain a number of important outstanding issues that require urgent resolution,

(h) Noting with concern:

- that the Agency environmental sampling at Natanz has revealed the presence of two types of high enriched uranium, which requires additional work to enable the Agency to arrive at a conclusion;
- that IAEA inspectors found considerable modifications had been made to the premises at the Kalaye Electric Company prior to inspections that may impact on the accuracy of the environmental sampling;
- that some of Iran's statements to the IAEA have undergone significant and material changes, and that the number of outstanding issues has increased since the report;
- that despite the Board's statement in June 2003 encouraging Iran, as a confidence-building measure, not to introduce nuclear material into its pilot centrifuge enrichment cascade at Natanz, Iran has introduced such material;

(i) Expressing grave concern that, more than one year after initial IAEA inquiries to Iran about undeclared activities, Iran has still not enabled the IAEA to provide the assurances required by Member States that all nuclear material in Iran is declared and submitted to Agency safeguards and that there are no undeclared nuclear activities in Iran,

(j) Mindful of Iran's heavy responsibility to the international community regarding the transparency of its extensive nuclear activities,

(k) Recognising the basic and inalienable right of all Member States to develop atomic energy for peaceful purpose,

(l) Stressing the need for effective safeguards in order to prevent the use of nuclear material for prohibited purposes in contravention of safeguards agreements, and underlining the vital importance of effective safeguards for facilitating cooperation in the field of peaceful uses of nuclear energy,

1. Calls on Iran to provide accelerated cooperation and full transparency to allow the Agency to provide at an early date the assurances required by Member States;

2. Calls on Iran to ensure there are no further failures to report material, facilities and activities that Iran is obliged to report pursuant to its safeguards agreement;

3. Reiterates the Board's statement in June 2003 encouraging Iran not to introduce nuclear material into its pilot enrichment cascade in Natanz, and in this context calls on Iran to suspend all further uranium enrichment-related activities, including the further introduction of nuclear material into Natanz, and, as a confidence-building measure, any reprocessing activities, pending provision by the Director General of the assurances required by Member States, and pending satisfactory application of the provisions of the additional protocol;

4. Decides it is essential and urgent in order to ensure IAEA verification of non-diversion of nuclear material that Iran remedy all failures identified by the Agency and cooperate fully with the Agency to ensure verification of compliance with Iran's safeguards agreement by taking all necessary actions by the end of October 2003, including:

(i) providing a full declaration of all imported material and components relevant to the enrichment programme, especially imported equipment and components stated to have been contaminated with high enriched uranium particles, and collaborating with the Agency in identifying the source and date of receipt of such imports and the locations where they have been stored and used in Iran;
(ii) granting unrestricted access, including environmental sampling, for the Agency to whatever locations the Agency deems necessary for the purposes of verification of the correctness and completeness of Iran's declarations;
(iii) resolving questions regarding the conclusion of Agency experts that process testing on gas centrifuges must have been conducted in order for Iran to develop its enrichment technology to its current extent;
(iv) providing complete information regarding the conduct of uranium conversion experiments;
(v) providing such other information and explanations, and taking such other steps as are deemed necessary by the Agency to resolve all outstanding issues involving nuclear materials and nuclear activities, including environmental sampling results;

5. Requests all third countries to cooperate closely and fully with the Agency in the clarification of open questions on the Iranian nuclear programme;

6. Requests Iran to work with the Secretariat to promptly and unconditionally sign, ratify and fully implement the additional protocol, and, as a confidence-building measure, henceforth to act in accordance with the additional protocol;

7. Requests the Director General to continue his efforts to implement the Agency's safeguards agreement with Iran, and to submit a report in November 2003, or earlier if appropriate, on the implementation of this resolution, enabling the Board to draw definitive conclusions; and

8. Decides to remain seized of the matter.

IAEA
International Atomic Energy Agency

Board of Governors

GOV/OR.1072
Date: July 2003

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Record of the 1072nd Meeting

Held at Headquarters, Vienna, on Thursday, 19 June 2003, at 10.45 a.m.

Extract (paras. 52-58)

52. The CHAIRPERSON, summing up the discussions on the issue, said that the Board had expressed its appreciation for the Director General's report of 6 June, which provided a factual and objective description of developments since March in relation to safeguards issues in the Islamic Republic of Iran which needed to be clarified, and actions that needed to be taken.

53. The Board had commended the Secretariat for the extensive verification activities it had undertaken and had expressed full support for its ongoing efforts to resolve outstanding questions. It had shared the concern expressed by the Director General in his report at the number of Iran's past failures to report material, facilities and activities, as required by its safeguards obligations. Noting the Iranian action taken so far to correct those failures, the Board had urged Iran promptly to rectify all safeguards problems identified in the report and to resolve questions that remained open.

54. The Board had welcomed Iran's reaffirmed commitment to full transparency and had expressed the expectation that Iran would grant the Agency all access deemed necessary by it, in order to create the necessary confidence in the international community. Noting that the enrichment plant was under IAEA safeguards, the Board had encouraged Iran, pending the resolution of related outstanding issues, not to introduce nuclear material at the pilot enrichment plant as a confidence-building measure.

55. The Board had called on Iran to co-operate fully with the Agency in its ongoing work. Specifically, the Board had taken note of the Director General's introductory statement on 16 June in which he had called on Iran to permit the Agency to take environmental samples at the particular location regarding which allegations about enrichment activities had been made.

This record is subject to correction. Corrections should be submitted in one of the working languages, in a memorandum and/or incorporated in a copy of the record. They should be sent to the Secretariat of the Policy-Making Organs, International Atomic Energy Agency, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria; fax xx43 1 2600 29108, e-mail secpmo@iaea.org, or from GovAtom via the Feedback link. Corrections should be submitted within three weeks of the receipt of the record.

56. The Board had welcomed Iran's readiness to look positively at signing and ratifying an additional protocol, and had urged Iran promptly and unconditionally to conclude and implement an additional protocol to its safeguards agreement, in order to enhance the Agency's ability to provide credible assurances regarding the peaceful nature of Iran's nuclear activities, particularly the absence of undeclared material and activities.

57. Finally, the Board had requested the Director General to make a further report on the situation whenever appropriate.

58. The Chairperson's summing-up was accepted.